

Chapter IV: Environmental Consequences

Introduction

This chapter describes the probable consequences (or impacts) that could result under the alternatives described in this environmental assessment. The chapter is divided into three parts. The Introduction describes the methodologies and assumptions that are common to all resource topic areas. The Methodologies and Assumptions section presents the methods used to assess impacts for each specific resource topic. The next section describes the impacts anticipated under each alternative, organized by resource topic. Environmental impacts are summarized in Table II- 1: Summary of Environmental Consequences, located at the end of Chapter II, Alternatives, of this document.

Impact Analysis

Each alternative contains an impact analysis for each individual resource topic. Impacts are evaluated based on context, duration, intensity and whether they are direct, indirect, or cumulative. In addition, impairment to park resources and values is considered.

The following guidelines were used to identify the context, duration, intensity (or magnitude) and type of impact.

- **Context.** The context considers whether the impact would be local or regional. For the purposes of this analysis, local impacts would be those that occur within the immediate vicinity of the South Fork Merced River Bridge Replacement Project, unless otherwise noted.
- **Duration.** The duration of an impact is noted as either short term or long term and defined in a range of years.
- **Intensity.** Indicators of the intensity of an impact, whether it is negligible, minor, moderate, or major, are included in the impact analysis and specifically defined by topic area in the methodology section that follows.
- **Type.** The type of impact refers to whether the effect is considered beneficial or adverse. Beneficial impacts would improve resource conditions. Adverse impacts would deplete or negatively alter resources. Mitigating actions listed in Chapter II would be taken during implementation of the action alternatives. With the exception of the cultural resource analysis, all impacts have been assessed under the assumption that mitigating measures have already been implemented.

Alternative 1 (the No Action Alternative) describes the status quo. This alternative provides a baseline from which to compare other action alternatives, to evaluate the magnitude of proposed changes, and to measure the environmental affects of these changes.

Cumulative Impacts

The Council on Environmental Quality describes a cumulative impact as follows (Regulation 1508.7):

A cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably

foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

To determine potential cumulative impacts for this environmental assessment, projects within the South Fork Merced River and Wawona area were identified. The cumulative projects identified included past actions, and planning and development activities currently under implementation or planned for implementation in the reasonably foreseeable future. Appendix D contains the list of cumulative projects included in the cumulative impacts analysis. These actions are evaluated in the impact analysis in conjunction with the impacts of an alternative to determine if they have any additive effects on a particular natural, cultural, or social resource. When a cumulative project was in the planning stage, the evaluation of cumulative impacts was based on a general description of the project.

Projects and plans that were considered in the cumulative analysis were: (1) the Merced River Plan, which protects and enhances the Outstandingly Remarkable Values and free-flowing condition of the river; (2) South Entrance/Mariposa Grove Site Planning, which considers alternatives for restoring giant sequoia habitat; (3) Wilderness Boundary Protection Land Exchange, Seventh Day Adventist Camp, Wawona, which involves a land exchange to protect wilderness; (4) Wawona Campground Improvement, which would rehabilitate the existing campground and construct an additional campground; (5) South Fork and Merced Wild and Scenic River Implementation Plan, which provides long-term protection of natural and cultural resources on adjacent U.S. Forest Service and Bureau of Land Management lands; (6) *Yosemite Valley Plan*, which implements the goals of the 1980 *General Management Plan* in Yosemite Valley, is designed to meet resource preservation and visitor experience goals in Yosemite Valley, including natural and cultural resource management and restoration, visitor services and recreational opportunities, transportation, and employee housing; (7) Mariposa County General Plan Update, which provides guidance for land use, zoning, and development throughout Mariposa County; and (8) Yosemite Area Regional Transportation System (YARTS), which evaluates the feasibility of a regional transportation system and identifies the best options for initial implementation and upkeep of such a system.

Impairment

Impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. The need to analyze and disclose impairment impacts originates from the National Park Service Organic Act (1916). The Organic Act established the National Park Service with a mandate “to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.”

An impact would be less likely to constitute an impairment if it is an unavoidable result, which cannot reasonably be further mitigated, of an action necessary to preserve or restore the integrity of park resources or values (NPS 2000a). An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park

- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park
- Identified as a goal in the park's *General Management Plan* or other relevant National Park Service planning documents

The evaluation of impairment of park resources was based on the type and intensity of impacts and the types of resources affected. Overall, beneficial impacts would not constitute impairment. With respect to the intensity of impacts, negligible and minor adverse impacts are not of sufficient magnitude to constitute impairment. Moderate and major adverse impacts may constitute impairment, but do not automatically do so. Rather, these impacts must be analyzed with respect to the three bulleted criteria above. Impairment is generally considered for geologic, hydrological, biological, cultural, and scenic resources and recreation. Impairment is addressed in the conclusion section of each impact topic under each alternative.

Methodologies and Assumptions

This section presents the methodologies and assumptions used to conduct the environmental impact analyses for each resource topic.

Geology, Geologic Hazards, and Soils

This impact assessment focuses on effects that geologic processes in Yosemite National Park could have on visitors, personnel, and facilities under each alternative of the South Fork Merced River Bridge Replacement Project. Geologic processes negatively affect visitors, personnel, and facilities when events such as earthquakes, and severe soil instability result in injury, death, or damage to facilities. The assessment also focuses on the effect of project alternatives on geologic processes, namely the formation and conservation of soil resources. Project-related actions could affect soil resources through accelerated erosion, soil loss, or soil removal.

Several assumptions regarding facility placement, geologic design parameters, and public safety were integrated into this assessment, as summarized below.

- Geologic risks to public safety are rarely predictable, and the extent of potential harm to people and property cannot be quantified. While the Wawona area is not prone to earthquakes or rockfalls, it is not possible to avoid risks due to geologic hazards, the analysis of effects was qualitative, and professional judgment was used to reach reasonable conclusions as to the context, intensity, and duration of potential impacts.
- Geotechnical studies to determine soil stability conditions would be performed prior to placing, designing, or relocating a facility within the park, and facility design within Yosemite National Park would conform to accepted building costs, particularly regarding seismic design parameters.
- Project activities would remove and/or cover the soil surface and result in significant changes to the basic soil properties of the topsoil. Excavation and removal of soil would result in a long-term impact because the basic soil properties, which have taken thousands of years to develop, would be altered. Capping the surface would reduce water movement and minimize the opportunity for the normal processes of physical transport and chemical transformations, such as illuviation, eluviation, and nutrient cycling.
- Soil excavation and redistribution would result in removal or mixing of the soil profile and disrupt soil structural characteristics, interrupting the chemical, physical, and biological processes that naturally occur in the soil. The level of change would be

dependent on the level of the alteration. It could take many years for the soil profile to redevelop.

- Soil compaction could occur as a result of project activities or in areas of intensive use such as trails. Wetland soils are very susceptible to compaction effects. Soil compaction reduces infiltration rates, thereby increasing surface runoff and the potential for erosion. Deep compaction of soils could impede subsurface flow. In turn, these effects could alter soil chemical processes such as nutrient transfer, biological processes such as root development and microbial patterns, and physical processes such as soil structure. Vegetation growth on compacted soils is often limited due to low infiltration and poor root penetration.
- Removal of vegetation through project activities or pedestrian use could result in accelerated erosion of the soil surface. Soils on steep slopes and along watercourses are especially susceptible to erosion.
- The addition of chemical constituents into the soils as a result of pavement installation, untreated runoff from paved surfaces, or from incidental spills could alter micro- or macro- organism populations, diversity, and dynamics. Machinery involved with project activities could deposit small amounts of natural and synthetic petrohydrocarbons onto soils through equipment failure and normal operations.

Ecological restoration that would minimize erosion potential and increase organic matter in the soil would be considered a beneficial effect. Short- term adverse effects could occur during site restoration activities where work equipment could compact soils, temporarily eliminate groundcover vegetation, and cause potential erosion from surface water runoff over the exposed soils.

Duration of Impact

Short- term impacts are considered temporary or transitional in nature. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long- term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent. Geologic impacts related to seismic events would likely be long-term and permanent.

Intensity of Impact

The intensity of an impact was based on its location within the park and what the types of activities and facilities are proposed in that location. The intensity of the impact would be negligible if facilities of any kind are located outside geologic hazard zones, or in rock areas with no soil resources.

There will always be a potential for adverse impacts to life and property due to seismic hazards, especially in developed areas. Therefore, management actions to avoid placement of facilities in areas susceptible to seismic hazards may decrease the risks but would not necessarily reduce the intensity of the impact.

For soils, impact intensity was characterized as negligible, minor, moderate, or major. Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly perceptible and localized. Moderate impacts would be apparent and have the potential to become larger. Major impacts would be substantial, highly noticeable, and may be permanent.

Type of Impact

All seismic events are potentially hazardous. The type of impact is related to risk, and it is difficult to estimate risk involving natural events. In general, reducing risk would be considered a beneficial impact. Generally, maintaining facilities within or moving facilities into a zone of higher risk or exposing people to greater levels of risk would be considered adverse.

Beneficial impacts to soils protect or restore natural soil conditions including abiotic and biotic components, soil structure, and moisture. Adverse impacts would result in degradation of chemical, physical, abiotic, or biotic soil components.

Hydrology, Floodplains, and Water Quality

Impacts on hydrology, floodplain values, and water quality are discussed under this resource topic. Hydrology refers to hydrologic processes such as flooding, erosion and deposition, and channel movement. Particular attention was given to alterations or restoration of water flow (e.g., placement or removal of facilities in the South Fork Merced River channel). Floodplain values are attributes of flooding that contribute to ecosystem quality, such as recharge of riparian ground water. Particular attention was given to alterations or restoration of the floodplain (e.g., placement or restoration of facilities in a floodplain). Water quality refers to the suitability of surface water for recreational use and wildlife habitat, particularly the enhancement or degradation of water quality. The National Park Service *Freshwater Resource Management Guidelines* (found in Procedural Manual- 77) requires the National Park Service to “maintain, rehabilitate, and perpetuate the inherent integrity of water resources and aquatic ecosystems.” The Clean Water Act requires the National Park Service to “comply with all Federal, State, interstate, and local requirements, administrative authority, and process and sanctions respecting the control and abatement of water pollution.

This assessment focuses on the physical and chemical processes of the Merced River, and how (relative to the No Action Alternative – Alternative 1) the action alternative would affect hydrologic processes, both during project activities and following project completion. The hydrology impact assessment herein evaluates how project activities would affect channel morphology, flooding, and water quality.

Channel Morphology

The analysis examines potential changes to channel morphology (channel depth, position, and streamflow) as a result of the alternatives. This section addresses existing and potential future restrictions to streamflow, potential repositioning of the channel bed, potential channel bed scour and bank erosion or instability, flow rates, and sediment transport mechanics.

Floodplains

National Park Service policy is to protect natural floodplain values and functions, and to minimize risk to life or property by avoiding the use of the regulatory floodplain whenever there is a feasible alternative. Impacts are evaluated in this section based on the potential to avoid loss of life and property during major floods. This section qualitatively analyzes the impacts or benefits to the river’s floodplain for the two alternatives.

The National Park Service manages floodplains in accordance with Executive Order 11988 (*Floodplain Management*) and the National Park Service Special Directive 93- 4 (*Floodplain Management Guidelines* [NPS 1993b]). The regulatory floodplain is defined as the 100- year, 500-

year, or maximum possible flood, depending on the type of activity and the amount of risk inherent in the nature of flooding at a location. Generally, the regulatory flood is the 100- year flood for most park functions in non- flash- flood environments. For critical facilities such as schools, hospitals, and large fuel- storage facilities, the regulatory floodplain is defined as the 500- year floodplain in non- flash- flood areas. Facilities such as picnic areas and day- visitor parking are exempt from the National Park Service guidelines because they are often located near water for the enjoyment of visitors and do not involve overnight occupation.

When there is no practicable alternative to placing facilities in a floodplain, National Park Service policy permits the use of the floodplain when there are compelling reasons for doing so, when the level of impact to natural floodplain processes is acceptable, and when mitigation is provided to protect human life and property. A statement of findings must be written to document a decision to place facilities within a floodplain.

Water Quality

This section identifies potential effects on water quality associated with project activities, such as the eventual collapse of the South Fork Bridge and associated rupturing of the sewerline attached to the bridge.

Duration of Impact

Short- term impacts are considered temporary or transitional. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long- term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly perceptible and localized, without the potential to expand if left alone. Moderate impacts would be apparent and have the potential to become larger. Major impacts would be substantial, highly noticeable, and may be permanent.

Type of Impact

Adverse impacts alter natural hydrologic conditions (e.g., impede flood flows, cause unnatural erosion or deposition, etc.) or degrade water quality (e.g., increase pollution or bacteria levels). Beneficial impacts would be those that restore natural hydrologic conditions (e.g., remove impediments to flood flows, stabilize riverbanks, etc.) or improve water quality (e.g., reduce potential for nonpoint source and point source pollution).

Wetlands

Wetlands and riparian areas are relatively rare in the context of the entire landscape. However, modification of even small wetland areas induces effects that are proportionally greater than elsewhere in an ecosystem (UC Davis 1996b).

The National Park Service is committed to minimizing wetland loss. The wetland protection statutes that guide the National Park Service include Executive Order 11990 (*Protection of Wetlands*); the National Park Service's Director's Order – 77- 1: Wetland Protection, and its

accompanying Procedural Manual #77-1; Clean Water Act Section 404; and the “no net loss” goal outlined by the White House Office on Environmental Policy in 1993. Executive Order 11990 requires that leadership be provided by involved agencies to minimize the destruction, loss or degradation of wetlands. Director’s Order – 77-1 and Procedural Manual #77-1 provide specific procedures for carrying out the executive order. Section 404 of the Clean Water Act authorizes the U.S. Army Corps of Engineers to grant permits for construction and disposal of dredged material in waters of the United States. Wetland impacts were estimated using wetland-specific data collected in the field during the fall of 2002. Wetland data were compared with each alternative to determine the area of potential effect. This analysis considers whether proposed actions could breach applicable federal laws, regulations, or executive orders.

Duration of Impact

Short-term impacts are considered temporary or transitional. Short-term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long-term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

Three primary measures were used to evaluate the intensity of impacts on wetlands: the size and type of the wetland, the integrity of the wetland, and the connectivity of the wetland to adjacent habitats.

The intensity of impacts has been described as negligible, minor, moderate, or major. Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly detectable, localized within a small area, and would not affect the overall viability of wetlands in the park. Moderate impacts would be apparent and have the potential to become major impacts. Major impacts would be substantial, highly noticeable, and could become permanent.

Type of Impact

Adverse impacts would degrade the size, integrity, or connectivity of wetland. Conversely, beneficial impacts would enlarge the size or enhance the integrity and connectivity of wetlands.

Vegetation

Impacts on vegetation communities were assessed in terms of duration, type, and intensity in site-specific, parkwide, and regional contexts.

Duration of Impact

Short-term impacts are considered temporary or transitional. Short-term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long-term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

Impacts on vegetation communities are assessed in terms of duration, type, and intensity in site-specific, parkwide, and regional contexts. Two primary parameters are used to evaluate the intensity of impacts on vegetation: (1) the size and continuity of the plant community, and (2) the natural structure, productivity, diversity (integrity), and rarity of the plant community.

Non- native species are discussed in terms of presence on previously disturbed sites and as invasive species within existing plant communities. Mitigation measures were applied, as applicable, to prevent impacts related to the introduction and spread of non- native plant species; however, they would continue to be managed by park staff in conjunction with National Park Service programs responsible for protection and long- term management of vegetation resources.

Human use impacts such as recreational use and foot traffic can extend beyond developed areas and affect plant community size and continuity. Human use can disturb or compact soils, create conditions favorable for non- native species or introduce non- native species, and trample native vegetation cover. Human use impacts that extend beyond development boundaries were considered as factor in determining the intensity of impacts on vegetation.

New development within an otherwise intact and undisturbed area may fragment or disassociate plant communities. Small areas of restoration surrounded by existing or new development may constitute a lesser beneficial impact on plant communities than restoration of a small area adjacent to a larger intact community. In general, reducing and limiting fragmentation, and maintaining connections within and among plant communities can minimize adverse effects on plant communities.

The evaluation of the integrity of plant communities was based on:

- Biodiversity
- Opportunities for natural processes to occur such as fire and flooding
- Exotic species introduction and spread
- Resilience of the plant community

In this document, biodiversity refers to the diversity of communities within an ecosystem, the diversity of species within a community, and genetic variation among individual species. Measures of biodiversity may include plant community structure and composition, connectivity of ecosystems, variation in age, structure (density and arrangement), individual species composition and abundance, and the presence or absence of natural structural layers.

Natural processes such as fire and flooding sustain many plant communities. This impact analysis considered whether changes would occur to opportunities for natural processes (or management options such as prescribed burning) to take place. For example, new development may prohibit opportunities for prescribed natural fire.

Non- native species can alter soil chemical and physical properties, hamper native species establishment, and ultimately alter native plant community structure and function. This impact analysis considered whether proposed actions would favor the establishment of non- native species, and the ability to contain and reverse non- native plant infestation.

Negligible impacts would have no measurable or perceptible changes in plant community size, continuity, or integrity. Minor impacts would be measurable or perceptible and localized within a relatively small area and the overall viability of the plant community would not be affected. Moderate impacts would cause a change in the plant community (e.g., size, continuity, and integrity); however, the impact would remain localized. The change would be measurable and

perceptible, but could be reversed. Major impacts would be substantial, highly noticeable, and could be permanent in their effect on plant community size, diversity, continuity, or integrity.

Type of Impact

Impacts were classified as adverse if they would reduce the size, continuity, or integrity of a plant community. Conversely, impacts were classified as beneficial if they would increase the size, continuity, or integrity of a plant community.

Wildlife

This section addresses the effects of alternatives on wildlife and their habitat, as represented by general vegetation types and riverine conditions present. The correlation of vegetation impacts and effects on wildlife is described within this section. Adverse effects to wildlife without modifications to wildlife habitat, are also considered.

In general, adverse effects on wildlife can be minimized by reducing and limiting habitat fragmentation; that is, by preserving and restoring large areas of habitat, patches of habitat, and maintaining connections within and among habitat types. Larger patches of habitat tend to support higher numbers and diversity of wildlife species than smaller ones, and connections between habitat patches enable the movement of wildlife between areas, enhancing reproduction and survival. Small patches of habitat can serve as stepping- stones for wildlife moving between larger blocks.

Ultimately, the value of a restored area or the impact of a developed area to wildlife is determined by the characteristics of the species affected. Home range size, tolerance of human disturbance, and life- history characteristics determine whether a species reoccupies a restored area or abandons a disturbed area.

Impacts on wildlife have been assessed in terms of changes in the amount and distribution of wildlife habitat, the size and connectivity of habitat, the integrity of the site (including past disturbance), the potential for habituation of wildlife to humans, and the relative importance of habitats.

Duration of Impact

Short- term impacts are considered temporary or transitional. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. These impacts would end with cessation of construction activity, or soon thereafter, and include:

- Noise, dust, and light emanating from construction sites could affect the use of surrounding habitats by wildlife.
- Vegetation removed, trampled, or run- over during temporary use of some habitat as areas for staging of machinery or materials would affect wildlife until such areas could be restored after the project.
- Diversion of water flows during construction would result in unnatural drying or wetting of habitats adjacent to sites.
- Wildlife could be killed by traffic or machinery associated with construction.
- Pits and trenches could entrap wildlife, resulting in their death.
- Spills of fuel, oil, hydraulic fluid, antifreeze, and other toxic chemicals could affect wildlife, especially those in aquatic environments.

- Construction personnel, at in-park residences or at work sites, could provide a source of human food to wildlife, resulting in conditioning of wildlife and in human/wildlife conflicts.

Long-term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

Negligible impacts are impacts that would not be measurable or perceptible. Minor impacts would be measurable or perceptible and would be localized within a relatively small area; however, the overall viability of the resource would not be affected. Without further impacts, negative effects would be reversed, and the resource would recover. Moderate impacts would be sufficient to cause a change in the resource (e.g., abundance, distribution, quantity, or quality); however, the impact would remain localized. The change would be measurable and perceptible, but negative effects could be reversed. Major impacts would be substantial, highly noticeable, and could be permanent without active management.

Type of Impact

Impacts were classified as adverse if they would negatively affect the size, continuity, or integrity of wildlife habitat, or result in unnatural changes in the abundance, diversity, or distribution of wildlife species. Conversely, impacts were classified as beneficial if they would positively affect the size, continuity, or integrity of wildlife habitat.

Special-Status Species

Wildlife

This analysis includes species listed under the Endangered Species Act as threatened or endangered; species that are Candidates for listing under the Endangered Species Act; species given Species of Concern status by the United States Fish and Wildlife Service; species listed by the State of California as threatened, endangered, or species of concern; and locally rare species of special importance to the park. The impact evaluation for special-status wildlife species was based on the following: (1) the known or likely occurrence of a species or its preferred habitat in the vicinity of the project area; (2) the direct physical loss or adverse modification of habitat; (3) the effective loss of habitat (through avoidance or abandonment) due to construction activity or noise, or the species' sensitivity to human disturbance.

Habitat fragmentation is also a critical factor for special-status species. Restored blocks of habitat should be large enough to support viable populations, and intact habitat should not be reduced or affected to the point that it would no longer support viable populations. A more detailed discussion of impact duration, intensity, and type is included in the preceding Wildlife section.

Plants

This analysis includes species given Species of Concern status by the United States Fish and Wildlife Service; species listed by the State of California as threatened, endangered, rare, or species of concern; and locally rare species of special importance to the park. The impact evaluation for special-status plant species was based on the following: (1) the known or likely occurrence of a species or its preferred habitat in the vicinity of the project area; (2) the direct

physical loss of habitat; (3) the effective loss of habitat through loss of habitat features such as surface water flows.

Duration of Impact

Short- term impacts are considered temporary or transitional in nature. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long-term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

Negligible impacts are impacts that would not be measurable or perceptible. Minor impacts would be measurable or perceptible and would be localized within a relatively small area; however, the overall viability of the resource would not be affected. Without further impacts, negative effects would be reversed, and the resource would recover. Moderate impacts would be sufficient to cause a change in the resource (e.g., abundance, distribution, quantity, or quality); however, the impact would remain localized. The change would be measurable and perceptible, but negative effects could be reversed. Major impacts would be substantial, highly noticeable, and could be permanent without active management.

Type of Impact

Impacts were classified as adverse if they would negatively affect population size, or habitat size, continuity, or integrity of a special- status species. Conversely, impacts were classified as beneficial if they would positively affect population size, or the size, continuity, or integrity of habitat.

Air Quality

The creation of pollutants resulting from the implementation of an alternative can contribute to an impact on air quality; however, air quality is a regional issue that is influenced by factors outside the immediate area. For example, the California Environmental Protection Agency concluded that the ozone exceedances in 1995 in the southern portion of the Mountain Counties Air Basin (i.e., Tuolumne and Mariposa Counties) were caused by transport of ozone and ozone precursors from the San Joaquin Valley Air Basin.

The air quality impact assessment involved the identification and qualitative description of the types of activities associated with each of the alternatives that could affect air quality, corresponding emissions sources and pollutants, and relative source strengths. Based on the relative source strengths, a qualitative assessment was performed to determine the potential for higher pollutant emissions or concentrations, taking into account the frequency, magnitude, duration, location, and reversibility of the potential impact. In addition, regional pollutant transport issues were evaluated in the context of regional cumulative impacts.

Neither the National Park Service nor the Mariposa County Air Pollution Control District has established emissions- based criteria for evaluating the significance of project implementation impacts (NPS 2003a). Without such recommendations, the typical approach is to qualitatively evaluate the significance of temporary demolition- related impacts. The analysis of effects herein is qualitative, and professional judgment has been applied to reach reasonable conclusions as to the context, intensity, and duration of potential impacts. When possible, mitigation measure(s) are incorporated into the project to reduce the intensity of adverse effects.

Air quality impacts were evaluated in terms of intensity and duration and whether the impacts were considered beneficial or adverse. Cumulative effects on air quality were also considered based on past, present, and reasonably foreseeable future actions occurring in Yosemite National Park, in combination with the potential air quality effects of each alternative.

Duration of Impact

Short- term impacts are considered temporary, transitional, or bridge- removal related impacts associated with the project activities. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long- term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly perceptible and localized, without the potential to expand if left alone. Moderate impacts would be apparent and have the potential to become larger. Major impacts would be substantial, highly noticeable, and may be permanent.

Type of Impact

Impacts were considered beneficial or adverse to air quality. Beneficial air quality impacts would reduce emissions or lower pollutant concentrations, while adverse impacts would increase emissions or raise pollutant concentrations.

Noise

The noise impact assessment involves the identification and qualitative description of the types of actions that could affect the ambient noise environment, corresponding noise sources, relative source strengths, and other characteristics. Based on the relative source strengths, a qualitative assessment was performed to determine the potential for an increase in ambient noise levels. Assessments were also performed where noise- sensitive uses are located or would expose persons to excessive noise levels, taking into account the frequency, magnitude, duration, location, and reversibility of the potential impact.

Duration of Impact

Short- term impacts are considered temporary or transitional in nature. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long- term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly perceptible and localized, without the potential to expand if left alone. Moderate impacts would be apparent and have the potential to become larger. Major impacts would be substantial, highly noticeable, and may be permanent.

Type of Impact

Impact type was evaluated using the following definitions: beneficial impacts would be created through a reduction in decibels, and adverse impacts would be created through an increase in decibels.

Cultural Resources

This impact analysis methodology applies to three types of cultural resources: archeological sites, ethnographic resources, and cultural landscape resources (including individually significant historic structures and historic districts).

Section 106 of the National Historic Preservation Act, as amended, requires a federal agency to take into account the effects of its undertakings on properties included in, eligible for inclusion in, or potentially eligible for inclusion in the National Register of Historic Places, and provide the Advisory Council on Historic Preservation the reasonable opportunity to comment. A Programmatic Agreement (1999) was developed among the National Park Service at Yosemite, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation, in consultation with American Indian tribes and the public, to take into account the effects of park planning and operations on historic properties.

The methodology for assessing impacts to historic resources is based on stipulations V through VIII of the Programmatic Agreement (ACHP 1999). This includes: (1) establishing an area of potential effect; (2) assessing the background information regarding historic properties within this area and conducting any necessary surveys, inventories, and resource evaluations; (3) comparing the location of the impact area with that of resources listed, eligible, or potentially eligible for listing in the National Register of Historic Places; (4) identifying the extent and type of effects; (5) assessing those effects according to procedures established in the Advisory Council on Historic Preservation's regulations; and (6) considering ways to avoid, reduce, or mitigate adverse effects.

Cultural resource impacts in this document are described in terminology consistent with the regulations of the Council on Environmental Quality, and in compliance with the requirements of the National Environmental Policy Act, Section 106 of the National Historic Preservation Act, and the 1999 Programmatic Agreement regarding the Planning, Design, Construction, Operations and Maintenance of Yosemite National Park.

Duration of Impact

Impacts to historic properties (cultural resources) could be of short term, long term, or permanent duration. Analysis of the duration of impacts is required under National Environmental Policy Act, but is not required and is not usually considered in assessing effects in terms of National Historic Preservation Act.

Type of Impact

Impacts are considered either adverse or beneficial to historic properties (cultural resources) when analyzed under the National Environmental Policy Act. However, impact type is not viewed this way when conducting analysis under Section 106 of the National Historic Preservation Act. For the purposes of assessing effects to historic properties under the National Historic Preservation Act, effects are either adverse or not adverse. Effects under both the National Environmental Policy Act and the National Historic Preservation Act are considered adverse when they diminish the significant characteristics of a historic property.

Impacts can be either direct or indirect. Direct impacts result from specific actions, such as demolition of historic structures. Indirect impacts generally occur after project completion, and are a result of changes in visitor- use patterns or management of resources fostered by implementation of an action.

Intensity of Impact

The intensity of an impact on a cultural resource can be defined as negligible, minor, moderate, or major. Negligible impacts would be barely perceptible changes in significant characteristics of a historic property. Minor impacts would be perceptible and noticeable, but would remain localized and confined to a single element or significant characteristic of a historic property (such as a single archeological site containing low data potential within a larger archeological district, or a single contributing element of a larger historic district). Moderate impacts would be sufficient to cause a noticeable but not substantial change in significant characteristics of a historic property (such as an archeological site with moderate data potential or a small group of contributing elements within a larger historic district). Major impacts would result in substantial material alteration or destruction of the property or cause highly noticeable changes to any qualifying characteristics of a property that contribute to its historic significance (such as an archeological site with high data potential or a large group of contributing elements within a larger historic district).

The National Environmental Policy Act also calls for a discussion of the “appropriateness” of mitigation, and an analysis of the effectiveness of mitigation. A reduction in intensity of impact from mitigation is an estimate of the effectiveness of this mitigation under the National Environmental Policy Act. It does not suggest that the level of effect, as defined by implementing regulations for Section 106 of the National Historic Preservation Act, is similarly reduced. Although adverse effects under Section 106 may be mitigated, the effects remain adverse.

Mitigation in this document is based on the Programmatic Agreement and includes the avoidance of adverse effects or the application of one or more standard mitigation measures as described in stipulations VII (C) and VIII of the Programmatic Agreement. Avoidance strategies may include the application of the *Secretary of the Interior’s Standards and Guidelines for Archeology and Historic Preservation* (USDOI 1983), design methods such as vegetation screening when placing new facilities in a historic district, and the development of guidelines to ensure compatibility between new and existing facilities. Stipulation VIII of the Programmatic Agreement requires the National Park Service notify the State Historic Preservation Officer, American Indian tribes, and certain members of the public of its decision to implement standard mitigation measures as described in Stipulation VIII (A) for individual actions having an adverse effect on historic properties.

Presented below are the specific discussions of duration, intensity, and type of impacts to cultural resources, and a description of typical mitigation measures.

Archeological Resources

Archeological resources are typically considered eligible for inclusion in the National Register of Historic Places because of the information they have or may be likely to yield (36 CFR 60.4).

Any change in the physical attributes of an archeological site is irreparable and considered adverse and of permanent duration. Adverse impacts to archeological resources most often occur as a result of earthmoving activities within an archeological site area, soil compaction or increased erosion, unauthorized surface collection, or vandalism. Beneficial impacts to archeological resources can occur when patterns of visitor use or management action are changed near archeological resources such that an ongoing impact, which would otherwise continue to degrade

archeological resources, is reduced or arrested. Direct impacts can occur as a result of grading, trenching, or other activities that damage the structure of an archeological site. Indirect impacts can occur as a result of increasing visitor activity or management action near an archeological site, leading to things such as artifact collection, accelerated soil compaction, and erosion.

The intensity of impact to an archeological resource would depend upon the potential of the resource to yield important information, as well as the extent of the physical disturbance or degradation. For example, major earthmoving at an archeological site with low data potential might result in a minor, adverse impact. Negligible impacts would be barely perceptible and not measurable, and would usually be confined to archeological sites with low data potential. Minor impacts would be perceptible and measurable, and would remain localized and confined to archeological site(s) with low to moderate data potential. Moderate impacts would be sufficient to cause a noticeable change, and would generally involve one or more archeological sites with moderate to high data potential. Major impacts would result in substantial and highly noticeable changes, involving archeological site(s) with high data potential.

For archeological resources, mitigation includes avoidance of sites through project design, or recovery of information that makes sites eligible for inclusion in the National Register of Historic Places. According to Stipulation VII (C) of the Programmatic Agreement, impacts to archeological resources are considered not adverse for purposes of Section 106 of the National Historic Preservation Act if data recovery is carried out in accordance with the *Archeological Synthesis and Research Design* (Hull and Moratto 1999).¹

Ethnographic Resources

Ethnographic resources are considered eligible for inclusion in the National Register of Historic Places as traditional cultural properties (or places) when: (1) a district, site, building, structure, or object is rooted in a community's history and is important for maintaining the continuing cultural identity of the community; and (2) the property(ies) meet National Register criteria for significance and integrity.

Impacts to ethnographic resources occur as a result of changes in the physical characteristics, access to, or use of resources, such that the cultural traditions associated with those resources are changed or lost. Beneficial impacts can occur when intrusive facilities, or visitor or management activities are removed from a traditional use area; when ecological conditions are improved at a gathering area such that the traditionally used resource is enhanced; or when access for American Indian people is enhanced. Adverse impacts occur when physical changes to a traditionally used resource or its setting degrade the resource itself, or degrade access to or use of a resource.

Impacts are considered short term if they represent a temporary change in important vegetation or temporarily restrict access to an important resource, and do not disrupt the cultural traditions associated with that resource for a noticeable period of time. They are considered long term if they involve a change in important vegetation or cultural feature, or addition of a new facility or visitor use that would change the physical character of or access to a resource for a noticeable period of time. This period of time would vary by resource type and traditional practitioners. These long-term changes would disrupt cultural tradition(s) associated with the affected resource, but the disruption would not alter traditional activities to the extent that the important cultural traditions associated with the resource are lost. Permanent impacts to ethnographic resources would involve irreversible changes in important resources such that the ongoing cultural traditions associated with those resources are lost.

¹ Under the Advisory Council on Historic Preservation's revised regulations of June 17, 1999 (36 CFR 800, *Protection of Historic Properties: Final Rule and Notice*), data recovery is considered to be an adverse effect. However, according to part 800.3 (A)(2) of these regulations, provisions of programmatic agreements in existence at the effective date of the new regulations remain in effect.

The intensity of impacts to an ethnographic resource would depend on the importance of the resource to an ongoing cultural tradition, as well as the extent of physical damage or change. Negligible impacts would be barely perceptible and not measurable, and would be confined to a small area or single contributing element of a larger National Register district (such as the ethnographic landscape). Minor impacts would be perceptible and measurable, and would remain localized and confined to a single contributing element of a larger National Register district. Moderate impacts would be sufficient to cause a change in a significant characteristic of a National Register district or property, and/or would generally involve a small group of contributing elements in a larger National Register district. Major impacts would result in substantial and highly noticeable changes in significant characteristics of a National Register district or property, and/or would involve a large group of contributing elements in a larger National Register district and/or an individually significant property.

The National Park Service would continue to consult with culturally associated American Indian tribes according to stipulations of the Programmatic Agreement, as well as specific agreements such as the October 17, 1997 “Agreement Between the National Park Service, Yosemite National Park, and the American Indian Council of Mariposa County, Inc. for Conducting Traditional Activities,” to develop appropriate strategies to mitigate impacts on ethnographic resources. Such strategies could include identification of and assistance in providing access to alternative resource gathering areas, continuing to provide access to traditional use or spiritual areas, and screening new development from traditional use areas.

Cultural Landscape Resources, Including Individually Significant Historic Sites and Structures

Impacts to cultural landscape resources result from physical changes to significant characteristics of a resource or its setting. Beneficial impacts can occur as a result of restoration or rehabilitation of resources, or removal of incompatible or noncontributing facilities. Direct, adverse impacts generally occur as a result of modifying a significant characteristic of a historic structure or landscape resource; removal of a significant structure or landscape resource; or addition of new, incompatible facilities in proximity to a historic site or structure. Indirect adverse impacts can also occur following project completion. These impacts are generally associated with changes in historic vegetation, or continued deterioration of historic structures. They are considered indirect impacts, as they are not directly associated with project construction, but rather result from increased visitor use or change in management of resources fostered by the completed plan.

Impacts to historic structures and cultural landscape resources are considered short term if they involve activities such as temporary removal of vegetation or other contributing resources, road closures, or prescribed burns, where the impacts are noticeable for a period of from one to five years. Other examples of short-term impacts to historic structures include constructing scaffolding surrounding a building during rehabilitation work, or minor deterioration in historic fabric that is repairable as part of routine maintenance and upkeep. Impacts are considered long term if they involve a reversible change, lasting from five to twenty years, in a significant characteristic of a historic structure or landscape. These changes could include such actions as alteration of contributing resources or construction of an incompatible building addition or adjacent facility. Permanent impacts to a historic structure or landscape resources would include irreversible changes in significant characteristics, such as removal of contributing resources; restoration of natural systems and features; irreversible removal of historic fabric that changes the historic character of a property; or demolition of a historic structure.

Negligible impacts would be barely perceptible and not measurable and would be confined to small areas or a single contributing element of a larger National Register district. Minor impacts would be perceptible and measurable but remain localized and confined to a single contributing element of a larger National Register district. Moderate impacts would be sufficient to cause a change in a significant characteristic of an individually significant historic structure, or would

generally involve a single or small group of contributing elements in a larger National Register district. Major impacts would result from substantial and highly noticeable changes in significant characteristics of an individually significant historic structure, or would involve a large group of contributing elements in a National Register district.

Mitigation measures for historic structures and cultural landscape resources include measures to avoid impacts, such as rehabilitation and adaptive reuse, designing new development to be compatible with surrounding historic resources, and screening new development from surrounding historic resources. In situations where a historic structure was proposed for removal, the National Park Service would first consider options for relocating the structure to another location in the park for adaptive reuse. Standard mitigation measures, as defined in the Programmatic Agreement, include documentation according to standards of the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER). The level of this documentation, which includes photography and a narrative history, would depend on the significance of a resource (national, state, or local) and the nature of the resource (an individually significant structure, contributing elements in a cultural landscape or historic district, etc.). When a historic structure is slated for demolition, architectural elements and objects may be salvaged for reuse in rehabilitating similar structures, or they may be added to the park's museum collection. In addition, the historical alteration of the human environment and reasons for that alteration would be interpreted to park visitors.

Socioeconomics

The socioeconomic impact analysis qualitatively evaluates the effects of project alternatives on the regional economy. Due to the structure of the local economic relationships and the nature of the bridge replacement activities, these impacts are addressed in terms of Wawona and Mariposa Counties as a whole. Professional judgment was applied to reach reasonable conclusions as to the context, duration, and intensity of potential impacts.

The analysis considered both direct and secondary project-related spending effects. Direct effects represent the immediate spending within the sector of the economy where the initial stimulus occurs. Secondary effects include indirect effects and induced effects. Indirect effects represent the impact of the initial stimulus on the economy as a result of changes in business spending. Induced effects are the impacts of the initial stimulus on the economy from changes in personal consumption (as a result of changes in employee income). Total project-related spending is the combination of both direct and secondary spending effects.

Duration of Impact

Impact also included an assessment of duration. Distinguishing between short-term and long-term duration was necessary to understand the extent of the identified effects. In general, short-term impacts are temporary in duration and typically are transitional effects associated with implementation of an action (e.g., related to construction activities). In contrast, long-term impacts have a permanent effect on the social and economic environments (e.g., operational activities).

Intensity of Impact

The intensity of each impact was rated in terms of increasing severity, as negligible, minor, moderate, or major. Negligible impacts are effects considered not detectable and are expected to have no discernible effect on the socioeconomic environment. Minor impacts are slightly detectable and are not expected to have an overall effect on the character of the socioeconomic environment. Moderate impacts are detectable, without question, and could have an appreciable

effect on the socioeconomic environment. Such impacts would have the potential to initiate an increasing influence on the socioeconomic environment (particularly if other factors have a contributing effect). Major impacts are considered to have a substantial, highly noticeable influence on the socio economic environments, and could be expected to alter those environments permanently.

Type of Impact

Impacts were recognized as beneficial if they would improve upon characteristics of the existing socioeconomic environment, as it relates to Wawona and Mariposa Counties as a whole. Conversely, impacts were considered adverse if they would degrade or otherwise negatively alter the characteristics of the existing environment.

Transportation

This impact assessment focuses on the effect of temporary changes to the roadway system and parking spaces on traffic volumes and associated traffic flow, access and circulation, and safety conditions. Vehicle access over the South Fork Merced River would be maintained during bridge replacement through the use of the temporary Bailey bridge.

The analysis of effects is based on professional transportation engineering judgment. Relative to the No Action Alternative (Alternative 1), the Preferred Alternative (Alternative 2), which calls for complete replacement of the South Fork Bridge, would affect traffic flows, access and circulation, and safety during project work. Transportation impacts are evaluated in terms of their context, duration, and intensity, and whether the impacts are considered to be beneficial or adverse.

Duration of Impact

Short- term impacts are considered temporary, transitional, or bridge- removal related impacts associated with the project activities. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long- term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

The intensities of impacts consider whether the impact would be negligible, minor, moderate, or major. Negligible impacts are effects considered not detectable and would have no discernible effect on traffic flow and/or traffic safety conditions. Minor impacts are effects on traffic flow and/or traffic safety conditions that would be slightly detectable, but not expected to have an overall effect on those conditions. Moderate impacts would be clearly detectable and could have an appreciable effect on traffic flow and/or traffic safety conditions. Major impacts would have a substantial, highly noticeable influence on traffic flow and/or traffic safety conditions and could permanently alter those conditions.

Type of Impact

Impacts are considered in the context of being either beneficial or adverse on traffic flow and/or traffic safety conditions. Beneficial impacts would improve traffic flow and traffic safety by reducing levels of congestion and occurrences of vehicle/vehicle, vehicle/bicycle, and vehicle/pedestrian conflicts. Adverse impacts would negatively alter traffic flow and traffic safety by increasing levels of congestion and occurrences of such conflicts.

Scenic Resources

The overriding management purpose of any national park, as defined by the National Park Service 1916 Organic Act, is to conserve the scenery and natural and historic objects. Following this direction, the National Park Service determined impacts on scenic resources by examining the potential effects of the South Fork Merced River Bridge Replacement Project on the landscape character and/or features and how any changes may be experienced (visibility, viewpoints, etc.).

Impacts of the South Fork Merced River Bridge Replacement Project on visual resources were examined and determined by:

- Comparing the existing visual character of the landscape in terms of the color, contextual scale, and formal attributes of landscape components and features, and the degree to which project actions would affect (i.e., contrast or conform with) that character; and
- Analyzing changes in experiential factors, such as whether a given action would result in a visible change, the duration of any change in the visual character, the distance and viewing conditions under which the change would be visible, and the number of viewers that would be affected.

Scenic resources impacts consist of substantial changes that would alter (1) existing landscape character, whether foreground, intermediate ground, or background, and would be visible from viewpoints the National Park Service has established as important; (2) access to historically important viewpoints or sequence of viewpoints; or (3) the visibility of a viewpoint or sequence of viewpoints.

Duration of Impact

Short- term impacts are considered temporary or transitional in nature. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long-term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

The magnitude of impacts to the scenery within the view from specific vantage points and to specific scenic features is described as negligible, minor, moderate, or major as described below. Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly detectable or localized within a relatively small area. Moderate impacts would be those that are readily apparent. Major impacts would be substantial, highly noticeable, and/or result in changing the character of the landscape.

Type of Impact

Impacts were evaluated in terms of whether they would be beneficial or adverse to scenic resources. Beneficial impacts would enhance the existing landscape character, access to historically important viewpoints or sequence of viewpoints, or the visibility of a viewpoint or sequence of viewpoints. Adverse impacts would be effects that reduce the existing landscape character, access to historically important viewpoints or sequence of viewpoints, or the visibility of a viewpoint or sequence of viewpoints.

Recreation

This analysis evaluates the quality of recreation opportunities in terms of how they might be altered as a result of the alternatives. Developing a quantitative analysis of potential effects on recreation is not feasible. Analysis of effects is, therefore, qualitative and professional judgment was applied to reach reasonable conclusions as to the context, intensity, and duration of potential impacts.

Yosemite National Park, including the South Fork Merced River and the Wawona area, offers a broad spectrum of recreation opportunities, including access to and availability of such activities as use of non- motorized watercraft (e.g., rafts, inner tubes, kayaks), swimming and wading, hiking, backpacking, camping, rock climbing, fishing, sightseeing, photography, nature study, and bicycling. In addition, every visitor to Yosemite National Park brings unique expectations and thus, each has a unique experience. As a result, the environmental assessment identifies, where possible, how the quality of the experience would change as a result of removing and replacing the South Fork Bridge and removing the temporary Bailey bridge.

An assumption that frames the analysis was that visitor demand will increase over existing levels and will be the same for both alternatives. Analysis was based on whether there was a complete loss of a recreation opportunity, a change in access to or availability of a recreation opportunity, or a change in the aggregate of recreation opportunities for the visitor.

Duration of Impact

Short- term impacts are considered temporary or transitional in nature. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long-term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

The intensity of impacts has been defined as negligible, minor, moderate, and major. Negligible impacts would result in little noticeable change in visitor experience. Minor impacts would result in changes but without appreciably limiting or enhancing opportunities for recreation. Moderate impacts would change the recreational opportunities. Major impacts would eliminate or greatly enhance recreational opportunities

Type of Impact

Impacts were evaluated in terms of whether they would be beneficial or adverse to recreational opportunities. Beneficial impacts would enhance visitor participation and the quality of visitor experience. Adverse impacts would be effects that reduce visitor participation and quality of visitor experience.

Park Operations and Facilities

For purposes of this analysis, an alternative is assumed to have an impact (negative or beneficial on park operations and facilities) if it:

- Results in direct changes to park operation, facilities, or staffing requirements or policies associated with park operations

- Causes indirect effects on park operations staffing, such as effects on utility and roadway infrastructure, flooding, and impacts on provision of utilities, especially potable water and sewer services

Duration of Impact

Short- term impacts are considered temporary, transitional, or bridge- removal related impacts associated with the project activities. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long- term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly perceptible and localized, without the potential to expand if left alone. Moderate impacts would be apparent and have the potential to become larger. Major impacts would be substantial, highly noticeable, and may be permanent.

Type of Impact

Adverse impacts represent an increase in park operations staffing, from effects on utility and roadway infrastructure, flooding, and impacts on provision of utilities, especially potable water and sewer services. Beneficial impacts represent a decrease in park operations staffing, from effects on utility and roadway infrastructure, flooding, and impacts on provision of utilities, especially potable water and sewer services.

Alternative 1: No Action

The No Action Alternative maintains the status quo at the South Fork Bridge site. This alternative provides a baseline from which to compare the action alternative, to evaluate the magnitude of proposed changes, and to measure the environmental effects of those changes.

Natural Resources

Geology, Geologic Hazards, and Soils

The South Fork Bridge would gradually deteriorate over the ensuing 10- year period, and the piers and abutments would continue to restrict the free flow of the South Fork Merced River, causing site- specific erosion of soil from the banks. Soils would be subject to removal by scouring near and downstream of both abutments, and possibly as the result of eddying around piers that redirects the flows toward the banks. Further bridge deterioration would have a local, short- and long- term, minor, adverse impact on soil resources near the bridge and immediately downstream.

Geologic hazards could cause further structural damage to the South Fork Bridge and contribute to greater structural degradation that could accelerate the eventual collapse of the bridge structure. As a result of sediment scouring under the piers and abutments, the foundation system of the bridge has already been severely compromised rendering it unsafe for vehicle traffic, and likely to collapse in the near future as a result of either a single event during high river flows or

gradually, as the foundation system degrades from continued scour. Ground shaking from an earthquake could also be strong enough to cause sudden bridge collapse, given the instability of the structure. Uncontrolled collapse of the bridge could result in unpredictable river flows, potentially eroding riverbanks, undermining trails and Wawona Road, and rupturing the sewage, tertiary- treated water supply lines, and other utilities fixed to the bridge.

Under Alternative 1, South Fork Bridge would continue to be subjected to possible structural damage from earthquakes. Earthquake- induced ground shaking could accelerate structural degradation reducing the period of time before the bridge collapses. The bridge is located in an area of moderate seismicity, and earthquakes from several remote sources could trigger ground shaking sufficient to cause observable ground movement at the bridge site. The bridge has withstood numerous small and some relatively large earthquakes over the past 70 years without significant damage or collapse; however, the damage sustained in the 1997 flood has substantially compromised the foundation system of the bridge.

Retrieval of bridge materials scattered downstream during an uncontrolled collapse would require multiple ingress and egress points for construction equipment and personnel, potentially destabilizing the riverbank in locations downstream from the bridge. Debris retrieval activities would result in short- term impacts to soil resources and could include excessive erosion, soil compaction, and loss of topsoil. Long- term soil impacts would include residual damage to soil resources such as bank erosion and loss of topsoil caused by diverted floodwaters following the bridge collapse. Short- term bridge debris retrieval activities and the long- term results of erosion caused by diverted flood waters would, therefore, result in local, short- and long- term, moderate, adverse impacts to soil resources. Soil resources, throughout the remainder of the South Fork Merced River corridor would be unaffected by this alternative. Therefore, Alternative 1 would result in local, short- and long- term, moderate, adverse impacts to soil resources.

Summary of Alternative 1 Impacts

Under Alternative 1, gradual deterioration of the bridge over the ensuing 10- year period would result in local, short- and long- term, minor, adverse impacts to the soil resource. The uncontrolled collapse and the retrieval of bridge debris material would cause bank destabilization, erosion, and soil loss resulting in local, short- and long- term, moderate, adverse impacts to soil resources in the immediate vicinity of the South Fork Bridge.

Cumulative Impacts

Cumulative impacts to geologic and soil resources are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor in combination with potential effects of this alternative. The lack of geological exposures at the South Fork Bridge site precludes affects to this resource. A project proposed to improve the Wawona Campground, resulting in its expansion, would affect soil resources northwest of the South Fork Bridge. Protection of soil resources in one area and disturbance in another area would result from a land exchange with the Seventh Day Adventist Camp in Wawona. Alternative 1 and the cumulative projects would result in local, short- and long- term, moderate, adverse impacts to soil resources.

Conclusions

Under Alternative 1, gradual deterioration of the bridge structure would have a local, short- and long- term, minor, adverse impact on soil resources near the bridge. An uncontrolled bridge collapse and the retrieval of debris material would cause bank destabilization, erosion, and soil loss resulting in local, short- and long- term, moderate, adverse impacts to soil resources.

Alternative 1 and the cumulative impacts would result in local, short- and long- term, moderate, adverse impacts to soil resources.

Impairment

The No Action Alternative would result in local, short- and long- term, moderate, adverse impacts to soil resources in the immediate vicinity of the South Fork Bridge due to bank destabilization, erosion, soil compaction, and soil loss. Although the South Fork Merced River system and its geologic and soil resources are key natural resource components within Yosemite National Park, the effect of this alternative on the riverbanks and soils would be localized to the immediate project area, and the effect would not be considered severe. The extent and quality of soil resources throughout the remainder of the South Fork Merced River corridor would remain unaffected by this alternative. Therefore, Alternative 1 would not impair soil resources.

Hydrology, Floodplains, and Water Quality

Under Alternative 1, the existing condition and placement of the South Fork Bridge within the floodplain would continue to adversely influence river hydrology and present a potential flood hazard. A bridge, like any fixed structure in a river, can alter flow dynamics and result in localized morphologic changes to the bed and banks of the river. The South Fork Bridge was constructed in a moderately large floodplain and it locally constricts river flow and increases flow velocity, which leads to erosion of the banks, down- cutting of the riverbed, and scouring at the bridge abutments and piers and nearby riverbanks. These processes are ongoing and can be observed as bank erosion, both downstream and upstream of the abutments, and excessive scour beneath the river- right bridge pier. Considering that the South Fork Bridge, if left in place, would continue to constrict river flow and negatively affect the natural hydrologic regime, Alternative 1 would have a local, short- term, adverse impact on hydrologic processes that influence river morphology over the next 10 years. However, when the bridge collapses on its own accord under Alternative 1, near natural river hydrology would be restored upon debris removal, resulting in a local, long- term, minor, beneficial impact on hydrologic processes.

Streambank erosion



NPS Photo

The flood of January 1997 caused excessive scouring of the bridge foundation, especially to the river- right pier. Continued scouring and undermining of the bridge abutments and piers would eventually lead to either partial or full collapse of the abutments, piers, and bridge deck. Failure

could be gradual, lasting over several years as the foundation system degrades, or one flood event could be sufficient to dislodge the structure and initiate a complete failure. Further bridge deterioration over the next 10 years would have a local, short- term, minor, adverse impact on hydrology, floodplains, and water quality because of the continued constricted flows.

When failure does occur, either large bridge sections or smaller abutment and pier segments would collapse into the South Fork Merced River. Depending on the flows at the time of collapse, large pieces of fallen bridge structure could act as a dam, diverting flows to either side of the riverbanks. Smaller segments could also restrict and divert flows, leading to bank erosion or scour. Until the pieces could be removed from the river after collapse, when flow reduces sufficiently, bank erosion would continue. Flows diverted by debris could cause the river to leave the channel and result in localized flooding on either side of the river. Due to the potential for bridge collapse and subsequent erosion and flooding, Alternative 1 would have a local, short- term, moderate, adverse impact on hydrologic processes. However, these adverse impacts would be outweighed by the long- term benefits associated with reducing constriction to streamflows, allowing for improvement of the natural hydrologic regime after the bridge collapses.

Additional impacts to the South Fork Merced River hydrology and floodplain could result from the temporary Bailey bridge. The elevation of the temporary bridge is such that it lies within the 50- year flood flow for the South Fork Merced River. Because the temporary bridge is founded on shallow concrete spread footings, a significant flood event could result in bridge washout and collapse. Such an event, particularly in conjunction with collapse of the original South Fork Bridge, would result in additional scouring of the streambanks and upstream flooding. Therefore, Alternative 1 would result in a local, short- term, moderate, adverse impact on hydrologic processes.

Water quality impacts caused by the South Fork Bridge collapse, whether gradual or sudden, would be temporarily substantial. Water quality would be affected primarily by sediment released into the river from behind and beneath the bridge abutments and by concrete and steel from the bridge structure. Fine- grained sediments would flow farthest downstream and cause the greatest impact to the river by increasing turbidity, while solid structural materials from the bridge (concrete and steel) would constitute less of a water quality impact. In addition, retrieval of the collapsed bridge materials scattered downstream would require use of construction equipment along the river below the bridge. Debris retrieval activities could dislodge sediment from the riverbed and banks. Sediment and debris delivery to the river would continue if the bridge remained and eventually failed. In addition, if the 8- inch gravity- fed sewerline attached to the existing bridge is not re- routed prior to bridge collapse and is ruptured, raw sewage would flow into the South Fork Merced River. Depending upon the river flow during such an event, Alternative 1 would result in a short- term, moderate to major, adverse impact on water quality; therefore, Alternative 1 would represent a short- term, moderate to major, adverse impact to water quality.

Summary of Alternative 1 Impacts

Under Alternative 1, gradual deterioration of the South Fork Bridge would result in continuing local, short- term, minor, adverse impacts to hydrologic processes. The bridge would continue to constrict flows, deepen the riverbed, and narrow the floodplain in this river reach. The river is armored by cobble- to boulder- sized substrate through this reach. Alternative 1 would have short- term, moderate to major, adverse impacts on hydrologic processes and water quality due to the catastrophic collapse of the South Fork Bridge or temporary Bailey bridge, resulting in sewage release and subsequent debris retrieval activities. Over the long term, the collapsed bridge would be removed and a more natural river hydrology would be restored in this area, which would have a local, long- term, minor, beneficial impact on hydrologic processes.

Cumulative Impacts

Cumulative effects to hydrologic processes are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor, in combination with potential effects of Alternative 1.

Alterations to hydrology have occurred through development and use within the South Fork Merced River corridor since settlement of the Wawona area. Examples of actions that have had adverse effects on the hydrologic processes of the South Fork Merced River include placement of riprap; removal of large woody debris; and construction of bridges, impoundments, and buildings. These past actions have adversely impacted hydrologic processes, floodplains, and water quality.

The past, present, and future projects in the South Fork Merced River corridor, considered cumulatively with Alternative 1, would have a local, long- term, minor, beneficial effect on hydrologic processes and water quality. In particular, the implementation of the Merced River Plan, would provide protection and management of land that lies adjacent to the South Fork Merced River. The long- term beneficial effects associated with removal of the collapsed bridge under Alternative 1 would contribute to the beneficial cumulative effects, and largely offset the short- term adverse effects associated with the catastrophic collapse of the bridge.

Conclusions

Alternative 1 would result in local, short- term, minor, adverse impacts to river morphology, floodplains, and water quality because of increased flow velocity and erosion related to constricted flows, as the bridge deteriorates over the next 10 years. Further, Alternative 1 would have short- term, moderate to major, adverse impacts on hydrologic processes and water quality due to the catastrophic collapse of the South Fork Bridge or temporary Bailey bridge, and subsequent sewage release and debris retrieval activities. Over the long term, the collapsed bridge would be removed and a more natural river hydrology would be somewhat restored in this area, which would have a local, long- term, minor, beneficial impact on hydrologic processes.

The past, present, and future projects in the South Fork Merced River corridor, considered cumulatively with Alternative 1, would have a local, long- term, minor, beneficial effect on hydrologic processes and water quality. The long- term beneficial effects associated with removal of the collapsed bridge under Alternative 1 would contribute to the beneficial cumulative effects, and largely offset the short- term adverse effects associated with the catastrophic collapse of the bridge.

Impairment

Alternative 1 would result in short- term, moderate to major, adverse effects to hydrologic processes and water quality associated with catastrophic collapse of the bridge, but local, long- term, minor, beneficial effects associated with the ultimate removal of the bridge. Although the South Fork Merced River system and its associated hydrologic processes are a key resource within Yosemite National Park, the adverse effects of this alternative on river hydrology are primarily localized, temporary in duration, and largely offset by the long- term beneficial effects of ultimate bridge removal. The short- term adverse effects of this alternative would not be considered severe. Therefore, Alternative 1 would not impair hydrologic resources within the South Fork Merced River corridor.

Wetlands

Analysis

In the near term, the South Fork Bridge would remain and the piers and abutments would continue to restrict the free flow of the South Fork Merced River, causing site- specific erosion. The sparse scrub- shrub wetland that has established in the low- flow channel upstream of the existing bridge would continue to provide limited habitat and aesthetic interest. A small patch of sparse scrub- shrub wetland (approximately 200 ft²) growing on the edge of the low- flow channel immediately downstream of the northernmost pier would be subject to removal by the scouring occurring at the pier base and subsequent advancement downstream. The emergent wetlands and aquatic habitat occupying the bed and banks of Angel Creek, a small tributary drainage downstream of the existing bridge (adjacent to the Wawona Golf Course), would be unaffected by flows in the South Fork Merced River and any influence resulting from the South Fork Bridge.

Over the long term, the South Fork Bridge condition would continue to degrade and the continued scouring would result in the gradual loss of a small wetland area downstream. The result would be local, short- and long- term, negligible, adverse impacts to wetland and aquatic habitat.

Eventually the structure would fail. Bridge collapse would likely occur during a period of high flow and it is assumed that this collapse would occur in the next 10 years. It is also assumed that the utility lines, including the reclaimed waterline and the sewerline, would rupture upon collapse of the bridge. The addition of raw sewage to the river would result in a degradation of water quality and associated function and use as well as the potential for solid sewage debris to become lodged in wetland and riparian vegetation along the riverbanks. Since it is likely the bridge collapse would occur during high- flow conditions and impacts would be dependent on flow, sewage addition would have a local, short- term, moderate, adverse impact to wetlands and aquatic habitat. Collapse of the bridge could result in extensive erosion and the uncontrolled release of debris into the South Fork Merced River; 500 feet downstream is used as the debris transport distance for this assessment. Bridge materials washing downstream could affect wetland, riparian, and aquatic resources during transport by floodwaters (removal of vegetation or habitat from physical contact with debris) or following deposition (covering of vegetation or habitat). In addition, large pieces of concrete, re- bar, stonework, steel deck, and utility lines could dam the river, divert it from its channel, or substantially erode the otherwise stable riverbanks in this river reach. Sudden erosion would threaten the river- right bank downstream of the bridge, where a small amount of erosion has occurred. Diverted river flows and erosion could result in the temporary loss of riparian vegetation along the riverbanks and wetland and aquatic growth within the channel. Bridge debris could be deposited along the river channel and banks downstream and would locally alter hydrologic patterns and the aquatic environment temporarily.

It is assumed that the National Park Service would remove bridge debris, but activities associated with debris removal would not be conducted until low- flow conditions prevailed, which could be several months following a flood event. Adverse effects would result from heavy equipment and debris removal activities and could include soil disturbance, soil compaction, dust generation, vegetation removal, root damage, erosion, and the potential to introduce or spread non- native species. Debris collection activities would release silt and sediments into the water column and could result in the introduction of construction equipment- related pollutants (fuels and lubricants), further degrading the quality of aquatic and wetland habitats. Debris removal would have local, short- term, minor to moderate, adverse effects to approximately 1.5 acres of aquatic habitat.

Failure and subsequent removal of piers and abutments would help restore the free-flowing condition of the South Fork Merced River and return this reach to a more natural state, thereby enhancing its biological integrity. Although the channel of the South Fork Merced River would stabilize and natural recolonization would occur over time, this effect would possibly require 10 or more years. In the interim, erosion and erosion-related effects (e.g., bank instability, sediment deposition into the aquatic environment, uprooting vegetation) would continue. These effects would have a local, long-term, minor to moderate, adverse impact on the aquatic environment. Overall, Alternative 1 would result in a local, short- and long-term, minor to moderate, adverse impact on aquatic resources and riverine areas that provide habitat for a diversity of river-related species downstream of the South Fork Bridge. The extent and quality of wetland, aquatic, and riparian wildlife habitats throughout the South Fork Merced River corridor below Wawona would be unaffected.

Summary of Alternative 1 Impacts

Under Alternative 1, gradual deterioration would result in continuing local, short-term negligible, adverse impacts to wetlands and aquatic habitat in the immediate vicinity. Alternative 1 would result in local, short- and long-term, minor to moderate, adverse impacts to aquatic resources and riverine areas that provide habitat for a diversity of river-related species in the immediate vicinity of the South Fork Bridge due to catastrophic failure. Although natural stabilization of the wetland, riparian, and aquatic community would occur over time, restoration would not be complete for 10 or more years, resulting in a local, long-term, minor, adverse effect on wetland and aquatic habitats.

Cumulative Impacts

Cumulative effects to wetland and aquatic resources are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork River corridor, in combination with potential effects of this alternative.

Wetland and riparian systems of the South Fork Merced River corridor have been altered somewhat by development and visitor activities. The largest of these alterations in the project vicinity was associated with development of the Wawona Golf Course early in the 20th century. In order to provide habitat for turf grasses and a playable surface, the wetlands associated with this site were drained and likely filled. These changes have had negative effects to the size, form, and function of wetland, aquatic, and riparian habitats and related species.

Reasonably foreseeable future actions within the South Fork Merced River corridor are considered to have an overall beneficial effect on wetlands. For example, the Merced River Plan protects river-related natural resources through the application of management elements, including the River Protection Overlay, management zoning, protection and enhancement of Outstandingly Remarkable Values, and implementation of a VERP framework. The *South Fork and Merced Wild and Scenic River Implementation Plan* provides river-related resource protection and management along the common National Park Service/U.S. Forest Service boundary of the South Fork Merced River that occurs approximately three miles upstream of the South Fork Bridge. Exchanging land adjacent to the National Park Service Wilderness Boundary, which is currently owned and actively used as part of the Seventh Day Adventist Camp near Wawona with lands farther from the Wilderness Boundary, along with redesign and construction of the existing and new campground facilities, would further provide for resource preservation, protection, and management activities in the project vicinity.

Cumulative actions would have a long-term, minor, beneficial, cumulative effect on wetlands within the South Fork Merced River due to resource preservation and management focus. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would

have a net local, long- term, minor to moderate, adverse effect on wetland patterns when accounting for the Wawona Golf Course development.

Conclusions

Alternative 1 would result in local, short- and long- term, negligible adverse impacts to wetland and aquatic habitat and riverine resources in the immediate vicinity of the South Fork Bridge due to the gradual deterioration of the structure. Under Alternative 1, catastrophic failure of the bridge would have local, short- and long- term, minor to moderate, adverse impacts to wetland resources. Cumulative present and future actions would have a local, long- term, negligible to minor, beneficial, cumulative effect on wetlands within the South Fork Merced River corridor due to resource protection and management. Cumulative past actions have had a local, long- term, moderate, adverse, cumulative effect on wetlands within the South Fork Merced River corridor due to historic development. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net local, long- term, minor to moderate, adverse effect on wetland patterns.

Impairment

The No Action Alternative would result in a local, negligible to minor, adverse impact to wetland and aquatic resources and riverine areas that provide habitat for a diversity of river- related species in the vicinity of the South Fork Bridge. The effect of this alternative on wetland resources would be localized and would not be considered severe. The extent and quality of wetland, riparian, and other riverine habitats throughout the remainder of the South Fork Merced River corridor would remain unaffected. Therefore, Alternative 1 would not impair wetland resources.

Vegetation

Analysis

In the short term, the South Fork Bridge would remain and the piers and abutments would continue to restrict the free flow of the South Fork Merced River, causing site- specific erosion. Over the long term, the South Fork Bridge condition would continue to degrade and eventually the structure would fail. Bridge collapse would likely occur during a period of high flow, and it is assumed that this collapse would occur in the next 10 years. Collapse of the bridge could result in extensive erosion and the uncontrolled release of debris into the South Fork Merced River. Bridge materials washing downstream as well as raw sewage from the ruptured sewerline could affect riparian vegetation during transport by floodwaters (removal of vegetation or habitat from physical contact with debris) or following deposition (covering of vegetation or habitat). In addition, large pieces of concrete, re- bar, stonework, steel deck, and utility lines could dam the river, divert it from its channel, or substantially erode the otherwise stable riverbanks in this river reach. Sudden erosion would threaten the river- right bank downstream of the bridge, where a small amount of erosion has occurred. On this bank, several white alder, incense- cedar, and ponderosa pine trees would be lost due to erosion undermining the trees or by the direct impact of bridge debris. Likewise, white alder and incense- cedar trees established on the river- left bank adjacent to the bridge deck and abutment would likely also be lost, as described above. This would have local, short- and long- term, negligible to minor, adverse impacts to vegetation in the immediate vicinity of the South Fork Bridge.

It is assumed that the National Park Service would remove bridge debris, but activities associated with debris removal would not be conducted until low- flow conditions prevailed, which could be several months following a flood event. Adverse effects to vegetation could result from removal or trimming trees or shrubs to gain heavy equipment access to the river, soil disturbance, soil

compaction, root damage, and the potential to introduce or spread non- native species. Debris removal would have local, short- term, negligible to minor, adverse effects to native vegetation.

Failure and subsequent removal of piers and abutments would help restore the free- flowing condition of the South Fork Merced River and return this reach to a more natural state, thereby enhancing its biological integrity. Although the channel of the South Fork Merced River would stabilize and natural recolonization would occur over time, this effect would possibly require 10 or more years. In the interim, erosion and erosion- related effects (e.g., bank instability and undermining streamside vegetation) would continue. These effects would have a local, long- term, negligible, adverse impact on vegetation. Overall, Alternative 1 would result in a local, negligible, adverse impact to vegetation in the immediate vicinity of the South Fork Bridge. The extent and quality of riparian, wetland, aquatic, and upland vegetation throughout the South Fork Merced River corridor below Wawona would be unaffected.

Summary of Alternative 1 Impacts

Alternative 1 would result in local, short- and long- term, negligible to minor, adverse impacts to vegetation in the immediate vicinity of the South Fork Bridge.

Cumulative Impacts

Cumulative effects to vegetation resources are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork River corridor in combination with potential effects of this alternative.

Vegetation in the South Fork Merced River corridor has been substantially altered by development and visitor activities. These changes have had negative effects to the size, form, and function of upland, riparian, wetland, and aquatic vegetation communities and related wildlife species.

Reasonably foreseeable future actions within the South Fork Merced River corridor are considered to have an overall net benefit to vegetation. For example, the Merced River Plan protects river- related natural resources through the application of management elements, including the River Protection Overlay, management zoning, protection and enhancement of Outstandingly Remarkable Values, and implementation of a VERP framework. The *South Fork and Merced Wild and Scenic River Implementation Plan* provides river- related resource protection and management along the common National Park Service/U.S. Forest Service boundary of the South Fork Merced River that occurs approximately three miles upstream of the South Fork Bridge. The proposed land exchange with the Seventh Day Adventists would provide for restoration and reclamation of disturbed camp lands adjacent to a National Park Service Wilderness Boundary in exchange for moving camp facilities to a slightly larger parcel of less environmentally sensitive National Park Service property located west of the existing camp. This would result in an overall enhancement of vegetative resources in environmentally sensitive areas and a degradation of land in association with the new camp facilities. The redesign and construction of the existing and new campground facilities at Wawona would further provide for resource preservation, protection, and management activities in the South Fork Merced River drainage in the project vicinity. At the South Entrance, giant sequoia habitat would be restored in the Mariposa Grove of Giant Sequoias.

Cumulative actions would have a long- term, minor, beneficial, cumulative effect on vegetation within the South Fork Merced River due to resource preservation and management focus. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net local, long- term, negligible to minor, beneficial effect on vegetation patterns.

Conclusions

Alternative 1 would result in local, short- and long- term, negligible, adverse impacts to vegetation in the immediate vicinity of the South Fork Bridge. Cumulative actions would have a local, long-term, minor, beneficial, cumulative effect on vegetation resources within the South Fork Merced River corridor due to resource protection and management. Cumulative impacts would have a local, long- term, moderate, adverse, cumulative effect on vegetation resources within the South Fork Merced River corridor due to historic development. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net local, long- term, negligible to minor, beneficial effect on vegetation patterns.

Impairment

The No Action Alternative would result in a local, short- and long- term, negligible, adverse impact to vegetation in the immediate vicinity of the South Fork Bridge. The effect of this alternative on vegetation resources would be localized and would not be considered severe. The extent and quality of vegetation, including upland, riparian, wetland, and aquatic types throughout the remainder of the South Fork Merced River corridor would remain unaffected. Therefore, Alternative 1 would not impair vegetation resources.

Wildlife

Analysis

In the short term, the South Fork Bridge would remain and the piers and abutments would continue to restrict the free flow of the South Fork Merced River, causing site- specific erosion. The scour pools formed at the base of the piers would continue to provide a small amount of deeper water and protected habitat for aquatic organisms in a reach of river that is largely riffles and shallow runs. Aquatic mosses and a sparse stand of emergent scrub- shrub wetland would provide additional habitat structure within the riverbed. A narrow band of riparian trees and shrubs would provide wildlife habitat near the bridge abutments (roosting, perch, and nest sites), and sparsely vegetated upland habitats adjacent to the river would provide site- specific wildlife habitat diversity.

Over the long term, the South Fork Bridge condition would continue to degrade and eventually the structure would fail. Bridge collapse would likely occur during a period of high flow and it is assumed that this collapse would occur in the next 10 years. A sudden collapse of the bridge could cause raw sewage to enter the river affecting fish, other aquatic organisms, as well as other species that use the South Fork Merced River. Collapse of the bridge could result in extensive erosion and the uncontrolled release of debris into the South Fork Merced River that could temporarily affect aquatic resources, fish, and wildlife. Bridge debris could adversely affect large trees and the banks and channel of the South Fork Merced River, which provide habitat for species such as raptors, small mammals, and fish. Large pieces of concrete, re- bar, stonework, steel deck, and utility lines could dam the river, divert the river from its channel, or substantially erode the otherwise stable riverbanks in this area (one minor area of erosion was noted on the river- right bank). Sudden erosion would threaten several trees, including white alder, incense- cedar, and ponderosa pine that represent potential nest and perch locations for species of birds and small mammals such as squirrels. Suspended sediments would temporarily reduce dissolved oxygen levels, which could affect respiration of aquatic invertebrates and fish. Large debris would temporarily modify the channel and substrate of the South Fork Merced River at this location, which could result in a negligible, adverse impact on fish passage.

It is assumed that the National Park Service would remove bridge debris, but activities associated with debris removal would not be conducted until low flow conditions prevailed, which could be several months following a flood event resulting in bridge collapse. Adverse effects would result from heavy equipment and debris removal activities and could include soil disturbance, soil compaction, dust generation (e.g., potential adverse impacts to invertebrate respiration), vegetation removal (e.g., potential adverse impacts to nest and perch sites), and introduction of construction- related pollutants (e.g., temporary degradation of fisheries habitat). The amount of sediment potentially released during the retrieval of bridge components would be minor and would not cause turbidity or sedimentation sufficient to adversely affect the fishery resource downstream of the activities. Debris removal and sewage release would have regional, short-term, negligible to minor, adverse effects to wildlife. Alternative 1 would result in a local, short-term, moderate, adverse impact to wildlife in the immediate vicinity of the South Fork Bridge.

Failure and subsequent removal of piers and abutments would help restore the free- flowing condition of the South Fork Merced River and return this reach to a more natural state, thereby enhancing biological integrity and the fishery habitat. Over time, the channel of the South Fork Merced River would stabilize, natural recolonization would occur, and wildlife habitats would normalize. The scour pools currently present at the base of the piers would fill with riverbed materials, particularly cobble. Local wildlife would adjust to the riverbed stabilization process, although the effect could occur over 10 or more years. Overall, Alternative 1 would result in a local, short- term, minor to moderate, adverse impact to wildlife in the immediate vicinity of the South Fork Bridge. Long- term effects of Alternative 1 on wildlife would be local, negligible to minor, and beneficial. The extent and quality of habitat for a diversity of river- related wildlife species throughout the South Fork Merced River would be unaffected.

Summary of Alternative 1 Impacts

Alternative 1 would result in a local, short- term, moderate, adverse impact to wildlife in the immediate vicinity of the South Fork Bridge. The regional impacts would be short term, negligible to minor, and adverse. Long- term effects of Alternative 1 on wildlife would be local, negligible to minor, and beneficial.

Cumulative Impacts

Cumulative effects on wildlife are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor in combination with potential effects of this alternative.

Wildlife communities have been manipulated from early in park history. Wildlife of the region was affected due to logging, fire suppression, rangeland clearing, livestock grazing, mining, draining, damming, water diversion, and the introduction of non- native species. Fur- bearing mammals and animals considered dangerous predators (e.g., mountain lion) were trapped or controlled through the 1920s, and black bears were artificially fed as a tourist attraction until 1940. Naturally occurring wildland fires that are generally beneficial for wildlife habitat, were routinely suppressed until 1972 (Wuerthner 1994). Historic and current human activities influencing wildlife include recreational use, roads and trails, bridge construction, diversion dams, reservoirs, pipelines, riprap, facilities, campgrounds, and other recreational features.

Reasonably foreseeable future actions within the South Fork Merced River corridor are considered to have an overall beneficial effect on wildlife. For example, the Merced River Plan protects river- related natural resources through the application of management elements, including the River Protection Overlay, management zoning, protection and enhancement of Outstandingly Remarkable Values, and implementation of a VERP framework. The *South Fork and Merced Wild and Scenic River Implementation Plan* provides river- related resource protection

and management along the common National Park Service/U. S. Forest Service boundary of the South Fork Merced River that occurs approximately three miles upstream of the South Fork Bridge. The land exchange with the Seventh Day Adventists would enhance wildlife protection and habitat restoration adjacent to a National Park Service Wilderness Boundary, while degrading the wildlife habitat on lands where camp facilities would be relocated. The redesign and construction of the existing and new campground facilities at Wawona would further provide for resource preservation, protection, and management activities in the South Fork Merced River drainage in the project vicinity. However, expansion of campgrounds has the potential to adversely affect local wildlife.

Cumulative actions would have a local, long- term, minor to moderate, beneficial, cumulative effect on wildlife within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net local, long- term, minor to moderate, beneficial effect on wildlife patterns.

Conclusions

Alternative 1 would result in a local, short- term, minor to moderate, adverse impact to wildlife in the immediate vicinity of the South Fork Bridge, and a regional, short- term, negligible to minor, adverse impact on wildlife downstream from the bridge. Long- term effects of Alternative 1 on wildlife would be local, negligible to minor, and beneficial. Cumulative actions would have a local, long- term, minor to moderate, beneficial, cumulative effect on wildlife within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net long- term, minor to moderate, beneficial effect on wildlife patterns.

Impairment

The No Action Alternative would result in a local, short- term, minor to moderate, adverse impact to wildlife and wildlife habitat for a diversity of river- related species in the immediate vicinity of the South Fork Bridge. Long- term effects of Alternative 1 on wildlife would be local, negligible to minor, and beneficial. Although the South Fork Merced River and its related wildlife are key resources within the southern portion of Yosemite National Park, the adverse effect of this alternative on wildlife would be localized, short term, and would not be considered severe. The extent and quality of wildlife and wildlife habitat for a diversity of river- related species throughout the remainder of the South Fork Merced River reach would remain unaffected. Therefore, Alternative 1 would not impair wildlife resources.

Special-Status Species

Analysis

Of the special- status species known or likely to occur in the immediate vicinity of the South Fork Bridge, the Wawona riffle beetle and nine species of bats have been documented in the immediate vicinity (see Chapter III and Appendix C). However, suitable habitat for the other special- status species considered in Chapter III is present.

In the short term, the South Fork Bridge would remain and the piers and abutments would continue to restrict the free flow of the South Fork Merced River, causing site- specific erosion. The aquatic habitat of the riverbed and the sparse scrub- shrub wetland community that has established within the low- flow channel would continue to provide habitat for special- status species, particularly the Wawona riffle beetle, California red- legged frog, the northwestern and southwestern pond turtles, and the foothill yellow- legged frog. While standing, the South Fork

Bridge and the temporary Bailey bridge could provide roosts for species of bats, in particular. Over the long term, the South Fork Bridge condition would continue to degrade and eventually the structure would fail. Bridge collapse would likely occur during a period of high flow and it is assumed that this collapse would occur in the next 10 years. Collapse of the bridge could result in extensive erosion and the uncontrolled release of debris and raw sewage into the South Fork Merced River. Bridge materials and raw sewage washing downstream could temporarily affect special- status species. For example, bridge debris could bury or otherwise affect the aquatic habitat that supports the Wawona riffle beetle's life cycle (moss- covered cobbles) and/or potential habitat for the California red- legged frog, northwestern and southwestern pond turtles, harlequin duck, or the foothill yellow- legged frog. Sudden riverbank erosion would likely remove several short- stature white alder, incense- cedar, and ponderosa pine trees that could serve as perches for special- status raptor species (e.g., bald eagles, peregrine falcon, great gray owl, and California spotted owl) perch/nest sites for other bird species (e.g., little willow flycatcher, Vaux's swift, olive- sided flycatcher, black swift, hermit warbler, Lewis' woodpecker, rufous hummingbird, American dipper, white- headed woodpecker, and Nuttall's woodpecker), and mammals such as the Pacific fisher. Riverbank erosion could also remove potential habitat for special- status species of plants, including the Small's southern clarkia, Rawson's flaming trumpet, and the Yosemite lewisia. Similarly, changes in the river hydrology could alter suitable habitat for these plants. Suspended sediments or raw sewage would temporarily reduce dissolved oxygen levels, or change other water quality parameters, which could affect respiration, life cycles, or cover eggs of aquatic species such as the Wawona riffle beetle, California red- legged frog, northwestern and southwestern pond turtles, or the foothill yellow- legged frog. Bat roosting habitat would also be destroyed in a sudden collapse of the bridge.

It is assumed that the National Park Service would remove bridge debris, but activities associated with debris removal would not be conducted until low- flow conditions prevailed, which could be several months following a flood event and bridge collapse. Adverse effects would result from heavy equipment and debris removal activities and could include soil disturbance, soil compaction, dust generation, vegetation removal (e.g., potential adverse impacts to nest and perch sites for special- status raptors), root damage, erosion, introduction of construction- related pollutants (e.g., temporary degradation of habitat for aquatic species), and the potential to introduce or spread non- native species. The amount of sediment potentially released during the retrieval is expected to be minor and would not cause turbidity or sedimentation sufficient to adversely affect aquatic resources for special- status species downstream of the retrieval area. Bridge collapse and debris removal would have local, short- term, moderate, adverse effects to approximately 1.5 acres of aquatic habitat that likely supports the Wawona riffle beetle.

Failure and subsequent removal of piers and abutments would help restore the free- flowing condition of the South Fork Merced River and return this reach to a more natural state, thereby enhancing its biological integrity and habitat for aquatic special- status species such as those noted previously. Over time, the channel and bed of the South Fork Merced River would stabilize, natural recolonization of riverbed substrates would occur, and habitats would normalize. Although this effect likely would not be realized for 10 or more years, local special- status species such as raptors would adjust. Potential effects to the Wawona riffle beetle would be more pronounced due to the restricted riverbed habitat and short life span. Some roosting habitat for bats may be lost due to the collapse of the South Fork Bridge. Eventual bridge failure and the release of sediment and debris would have a short- term effect on the South Fork Merced River and could temporarily disrupt individual bats. Overall, Alternative 1 would result in a local, short- term, moderate, adverse impact to special- status species in the immediate vicinity of the South Fork Bridge. Downstream of the bridge the effects would gradually diminish resulting in a local, short- term, minor to moderate, adverse impact to special species downstream. Long- term effects of Alternative 1 on special- status species would be local, negligible to minor, and beneficial. The extent and quality of river- related habitats and species throughout the South Fork Merced River corridor would be unaffected.

Summary of Alternative 1 Impacts

Alternative 1 would result in a local, short- term, moderate, adverse impact to special- status species in the immediate vicinity of the South Fork Bridge, and a local, short- term, minor to moderate, adverse impact to special- status species downstream from the bridge. Long- term effects of Alternative 1 on special- status species would be local, negligible to minor, and beneficial.

Cumulative Impacts

Cumulative effects to special- status species are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork River corridor in combination with potential effects of this alternative.

Natural habitats, including those supporting the Wawona riffle beetle and other special- status aquatic species, the nine species of special- status bats, the numerous special- status birds, and special- status plants, have been manipulated almost since the inception of the park. Regional wildlife and vegetation patterns have been historically affected by logging, fire suppression, rangeland clearing, livestock grazing, mining, draining, damming, water diversions, and the introduction of non- native species. Historic and current human activities, influencing the special- status species include recreational use, roads and trails, bridge construction, diversion dams, reservoirs, pipelines, riprap, facilities, campgrounds, and other recreational features.

Reasonably foreseeable future actions with the South Fork Merced River corridor are considered to have an overall beneficial effect on special- status species. For example, the Merced River Plan protects river- related natural resources through the application of management elements, including the River Protection Overlay, management zoning, protection and enhancement of Outstandingly Remarkable Values, and implementation of a VERP framework. The *South Fork and Merced Wild and Scenic River Implementation Plan* provides river- related resource protection and management along the common National Park Service/U.S. Forest Service boundary of the South Fork Merced River that occurs approximately three miles upstream of the South Fork Bridge. The land exchange with the Seventh Day Adventists would enhance special- status protection and habitat restoration adjacent to a National Park Service Wilderness Boundary, while degrading the habitat on lands where camp facilities would be relocated. The redesign and construction of the existing and new campground facilities at Wawona would further provide for resource preservation, protection, and management activities in the South Fork Merced River drainage in the project vicinity. However, expansion of campgrounds and development of employee housing have the potential to adversely affect special- status species.

Cumulative actions would have a local, long- term, minor, beneficial cumulative effect on special- status species within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net local, long- term, minor, beneficial effect on special- status species.

Conclusions

Alternative 1 would result in local, short- term, moderate, adverse impacts to special- status species and aquatic habitat in the immediate vicinity of the South Fork Bridge. Long- term effects of Alternative 1 on special- status species would be local, negligible to minor, and beneficial. Cumulative actions would have a local, long- term, minor, beneficial cumulative effect on special- status species within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net local, long- term, minor, beneficial effect on special- status species.

Impairment

The No Action Alternative would result in a local, short- term, negligible to minor, adverse impact to special- status species that occur in the vicinity of the South Fork Bridge. Long- term effects of Alternative 1 on special- status species would be local, minor, and beneficial. The adverse effect of this alternative on special- status species would be localized and would not be considered severe. The extent and quality of aquatic, wetland, riparian, and other riverine habitats throughout the remainder of the South Fork Merced River corridor reach would remain unaffected. Therefore, Alternative 1 would not impair special- status species.

Air Quality

Analysis

Under Alternative 1, automobile and recreational vehicle traffic would continue to be slowed due to the speed and size limitations of the existing temporary Bailey bridge. This can cause negligible to minor, short- term, adverse impacts on local air quality, depending on the time of year (i.e., more traffic exists during the summer months, causing more congestion), meteorological conditions (e.g., wind speed, wind direction), and the type of vehicles (automobile versus recreational vehicle) crossing the temporary bridge.

Over the long term, the South Fork Bridge condition would continue to degrade, eventually leading to a failure of all or a portion of the bridge, and downstream transport of bridge materials. Further bridge deterioration would have a negligible adverse effect on air quality until collapse occurred. Bridge debris may be deposited in the river channel and along the banks, and would require removal activities. Effects would be primarily related to the use of equipment, dust, and vehicle trips to and from the area. The South Fork Bridge is located in state nonattainment areas for PM- 10 and ozone, and a national attainment area for ozone (currently, national PM- 10 attainment or nonattainment status is unclassified in this area). Monitoring data from Wawona and Jerseydale (approximately 12 miles west of Wawona) indicate exceedances of state and national standards for ozone have occurred near the project site. PM- 10 is monitored at the Yosemite Village Visitor Center, and exceedances of the state and national (only on one occasion in the last eight years) standards have been observed. Debris removal activities would temporarily affect pollutant concentrations in the vicinity of South Fork Bridge, but would not affect the attainment area status. Removal activities and vehicle traffic over paved surfaces heavily laden with earthen materials would generate substantial amounts of dust, including PM- 10 and PM- 2.5, primarily from fugitive sources (i.e., emissions released by means other than through a stack or tailpipe). Dust emissions would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather. These impacts would be mitigated through practices also described for the Preferred Alternative of this environmental assessment. The debris removal activities may also result in short- term traffic congestion at the temporary Bailey bridge, with associated increased vehicle emissions.

Alternative 1 would result in tailpipe emissions associated with use of mobile debris removal equipment, construction- worker commute trips, truck trips to haul bridge materials from the site to appropriate storage areas or recycling facilities, and traffic congestion. These emissions could affect local air quality, but adverse impacts would be local, short term, and negligible. The debris removal activities would generate emissions of ozone precursors and carbon monoxide (criteria air pollutant emissions), as well as toxic air contaminants, from the use of diesel- powered equipment. Toxic air contaminants are less pervasive in the atmosphere than criteria air pollutants, but they are linked to short- term (acute) or long- term (chronic or carcinogenic) adverse human health effects. Toxic air contaminants do not have corresponding ambient air quality standards. However, the limited duration of debris removal activities would limit the

potential for diesel particulates to adversely affect local air quality, resulting in local, short- term, minor, adverse impacts.

Summary of Alternative 1 Impacts

Further bridge deterioration would have a local, negligible to minor, adverse effect on air quality because of traffic congestion at the temporary Bailey bridge. Bridge debris removal, in response to an eventual, uncontrolled collapse of a portion of the South Fork Bridge, and traffic congestion at the temporary Bailey bridge, would result in local, short- term, negligible to minor, adverse impacts to air quality. However, the designated attainment status for PM- 10 or ozone would remain unchanged. There would be no long- term effect on air quality under this alternative.

Cumulative Impacts

Cumulative effects to air quality are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor and Yosemite Valley with potential effects of this alternative. The general population growth in the state of California and management plans and projects involving the South Fork Merced River corridor and Yosemite Valley could cumulatively affect air quality.

Since 1950, the population of California has tripled, and the rate of increase in vehicle- miles- traveled has increased six- fold (NPS 2003). Air quality conditions within the park have been influenced by this population growth and associated emissions from industrial, commercial, and vehicular sources in upwind areas. Since the 1970s, emissions sources operating within the park, as well as California, have been subject to local stationary- source controls and state and federal mobile- source controls. With the passage of time, such controls have been applied to an increasing number of sources, and the associated requirements have become dramatically more stringent and complex.

Reasonably foreseeable future actions proposed in Yosemite National Park and near the South Fork Bridge could have beneficial or adverse impacts on air quality. Construction activities associated with the proposed South Entrance/Mariposa Grove Site Planning, employee housing proposed in the *Yosemite Valley Plan*, and the Wawona Campground Improvement would have short- term, localized, adverse effects on air quality from fugitive dust, criteria pollutant, and toxic air contaminant emissions from the operation of construction equipment. Wawona Campground improvements would increase the number of visitors and result in long- term, localized, adverse effects on air quality from increased vehicle emissions and the use of campfires. The *Yosemite Valley Plan* identifies potential relocation of employees to Wawona resulting in long- term, localized, adverse effects on air quality from increased vehicle emissions. However, projects such as YARTS could have a net beneficial effect on air quality by improving the attractiveness of alternative modes of transportation and thereby reducing private automobile trips throughout the park. The general goal of this project is to increase transportation options and reduce reliance on automobiles, relieving congestion and associated increased stationary emissions as a result of idling vehicles, having a long- term, beneficial effect on air quality.

Although cumulative growth in the region would tend to adversely affect air quality, implementation of ongoing state and federal mobile- source control programs would reduce this impact to a degree. With respect to particulate matter, conditions near the South Fork Bridge would be determined by both regional and local sources, and could be beneficial or adverse. Considered with the adverse impacts associated with regional air quality influences, the cumulative projects would have a local, long- term, minor beneficial effect on air quality near the South Fork Bridge. The short- term adverse effects associated with potential bridge debris removal activities would not offset the long- term, beneficial effects of the cumulative projects.

Conclusions

Under Alternative 1, bridge debris removal, in response to an eventual, uncontrolled collapse of a portion of the South Fork Bridge, and traffic congestion at the temporary Bailey bridge, could result in regional and local, short- term, negligible to minor, adverse impacts to air quality. However, the designated attainment status for PM- 10 or ozone would remain unchanged. There would be no long- term effect on air quality under this alternative.

Alternative 1 and the cumulative projects would result in local, long- term, minor, beneficial impacts on air quality near the South Fork Bridge. The localized, short- term, adverse effects associated with potential bridge debris removal activities would not offset the long- term, beneficial effects of the cumulative projects.

Impairment

The No Action Alternative would result in a local, short- term, negligible to minor, adverse impact to air quality. Air quality impacts would not be considered severe and would not impair park resources or values.

Noise

Analysis

At the South Fork Bridge site, automobile and recreational vehicle traffic would continue to be slowed due to the speed and size limitations of the existing temporary Bailey bridge. This can cause negligible to minor, short- term, adverse impacts on the local ambient noise environment, depending on the time of year (i.e., more traffic exists during the summer months, causing more congestion), meteorological conditions (e.g., wind speed, wind direction), and the type of vehicles (automobile versus recreational vehicle) crossing the temporary bridge.

Under Alternative 1, the gradual deterioration of the bridge over time would have no effect on the ambient noise levels of the area. However, bridge debris removal activities, resulting from the eventual, uncontrolled collapse of the South Fork Bridge would have local, short- term, minor to moderate, adverse impacts on noise. Effects would be primarily related to bridge debris removal (e.g., crane operation) and debris haul trips, which would also raise ambient noise levels along haul routes. Operation of heavy equipment at the site during retrieval could generate substantial amounts of noise and would occur within close proximity to sensitive receptors, including the Wawona Campground and picnic areas, Wawona Store, Wawona Hotel, the school in Wawona, Seventh Day Adventist Church camp, Pioneer Yosemite History Center, and the Wawona Golf Course. Table IV- 1 provides typical noise levels generated by construction equipment.

Noise near the South Fork Bridge would vary depending upon a number of factors, such as the number and types of equipment in operation on a given day, usage rates, the level of background noise in the area, and the distance between sensitive uses and the construction site.

The specific mix of equipment to be used in bridge debris removal, which could include bridge cutting and removal of any portion left standing, is unknown, but may include the use of cranes, excavators, backhoes, skid steer loaders, trucks, graders, jack hammers, and concrete saws. Noise levels would decrease by about 6 dBA with each doubling of distance from the site (i.e., noise levels from crane use would be in the range of 83 to 88 dBA 50 feet from the site, and about 77 to 82 dBA 100 feet from the site). Equipment use would have local, short- term, minor to moderate, adverse impacts on noise.

Over the long term, the acoustical environment in the vicinity of the South Fork Bridge would be shaped largely by natural sources of sound (e.g., rushing water and wind), interspersed with human- caused sources of noise (e.g., motor vehicles, talking and yelling, and aircraft).

Table IV-1. Typical Noise Levels Associated with Construction Equipment

Equipment	Typical Noise Level (dBA) 50 Feet From the Source
Air Compressor	81
Backhoe	80
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	85
Paver	89
Pneumatic Tool	85
Pump	76
Rock Drill	98
Roller	74
Saw	76
Scraper	89
Truck	88

Summary of Alternative 1 Impacts

Bridge debris removal activities, related to the eventual, uncontrolled bridge failure, and traffic congestion at the temporary Bailey bridge, would result in local, short- term, negligible to moderate, adverse impacts to the ambient noise environment. However, over the long term, the ambient noise environment near the South Fork Bridge would be shaped largely by natural sources of sound interspersed with human- caused sources of noise.

Cumulative Impacts

Cumulative effects to noise are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor and Yosemite Valley with potential effects of this alternative.

The Merced River Plan and the *South Fork and Merced Wild and Scenic River Implementation Plan* were developed to protect the river- related natural and cultural resources. The purpose of the Merced River Plan is to protect and enhance the Outstandingly Remarkable Values and free-flowing condition of the river for the benefit and enjoyment of future generations, which would benefit the ambient noise environment near the South Fork Bridge. The *South Fork and Merced Wild and Scenic River Implementation Plan* provides river- related resource protection and management along the three- mile reach upstream of the South Fork Bridge that serves as a

boundary to National Park Service and U.S. Forest Service lands. This plan would also benefit the ambient noise environment near the project site.

Reasonably foreseeable future actions proposed in Yosemite National Park and near the South Fork Bridge could have beneficial or adverse impacts on noise. Construction activities associated with the South Entrance/Mariposa Grove Site Planning, South Fork Merced River Bridges Replacement, employee housing at Wawona proposed in the *Yosemite Valley Plan*, and the Wawona Campground improvement would have short- term, localized, adverse effects on noise from the operation of construction equipment. However, projects such as YARTS could have a net beneficial effect on the ambient noise environment by improving the attractiveness of alternative modes of transportation, and thereby reducing private automobile trips throughout the park. The general goal of this project is to relieve congestion and to provide for alternative means of transportation, having a long- term, beneficial effect on noise. To the extent that transportation- related projects would replace automobile trips with bus trips, the anticipated beneficial effect would depend on ridership levels (and the corresponding number of automobile trips that would be avoided) and the technology selected for the buses.

The gradual increase in annual visitation to the park would likely offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated noise. In the short term, Alternative 1 and other cumulative actions would, therefore, contribute to the local, long-term, minor, adverse, cumulative effect on the noise environment near the South Fork Bridge.

Conclusions

Bridge debris removal, in response to an eventual collapse of all or a portion of the South Fork Bridge, and traffic congestion at the temporary Bailey bridge, would result in local, short- term, negligible to moderate, adverse impacts on noise. However, over the long term, the ambient noise environment near the South Fork Bridge would be shaped largely by natural sources of sound interspersed with human- caused sources of noise.

The assumed gradual increase in annual visitation to the park would likely offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated noise. Alternative 1 would, therefore, contribute to the local, long- term, minor, adverse, cumulative effect on the noise environment near the South Fork Bridge.

Impairment

The No Action Alternative would result in a local, short- term, negligible to minor, adverse impact from noise. Noise impacts would not be considered severe and would not impair park resources or values.

Cultural Resources

Archeological Resources

Analysis

Under Alternative 1, there would be no change in management and treatment of archeological sites in the South Fork Bridge project area. The South Fork Bridge would gradually deteriorate over the ensuing 10- year period, and the piers and abutments would continue to restrict the free flow of the South Fork Merced River, causing site- specific erosion of soil from the banks. Further bridge deterioration would have a minor to moderate, adverse effect until collapse, which would likely occur during a period of high flow. Bridge debris generated during the collapse could dam the river, divert the river from its channel, or substantially erode the otherwise stable riverbanks in this area, particularly the river- right (north) bank, which could unearth sensitive prehistoric or historic archeological materials associated with site CA- MRP/171/H. Collapse of the South Fork Bridge would result in long- term, moderate, adverse impacts to archeological resources.

Although the banks of the South Fork Merced River would stabilize over time, this effect likely would not be realized for 10 or more years. In the interim, bank erosion and erosion- related effects that could potentially affect the archeological resource located adjacent to the north bank of the South Fork Merced River, would continue. Activities associated with removal of bridge debris are not anticipated to involve earth moving and grading that could affect archeological resources. The evidence of thousands of years of human occupation, reflected in the large number of archeological sites, throughout the remainder of the South Fork Merced River corridor would be unaffected.

Summary of Alternative 1 Impacts

Further bridge deterioration and possible collapse has the potential to have a long- term, minor to moderate, adverse effect on archeological resources in the vicinity of the South Fork Bridge. Since the intensity of impacts would depend on the nature, location, and extent of disturbance as well as the quantity and data potential of the archeological site affected, it is difficult to determine the intensities of those impacts. Any site- specific planning and compliance actions would be performed in accordance with stipulations in the park's 1999 Programmatic Agreement.

Cumulative Impacts

Cumulative impacts to archeological resources are based on analysis of past, present, and reasonably foreseeable future actions in the Wawona area, in combination with potential effects of this alternative.

In general, any archeological resources within the Wawona area are the result of thousands of years of human occupation. Development of facilities within the area has disturbed or destroyed numerous archeological resources and compromised the integrity of others, which has led to an adverse cumulative effect.

Reasonably foreseeable future actions proposed in the region that could have an adverse cumulative effect on archeological resources in the Wawona area include development- related projects, such as the proposed employee housing development, the Wawona Campground improvements, and the land exchange and subsequent disturbance of land for new facilities associated with the Seventh Day Adventist camp. Primary disturbance and ecological restoration associated with these projects could disturb individual archeological resources along the South

Fork Merced River, an archeologically sensitive area. The National Park Service would follow guidelines of the 1999 Programmatic Agreement and would avoid adverse effects to archeological resources to the greatest extent feasible.

Implementation of projects allowed under the Merced River Plan would have local, long- term, adverse, cumulative effects on archeological resources, although these projects would be subject to specific mitigation measures.

The Merced River Plan provides a framework for decision- making on future management actions within the South Fork River corridor through the application of a consistent set of decision- making criteria and considerations composed of seven management elements (see Chapter V, Merced Wild and Scenic River). The Merced River Plan designates cultural resources as an Outstandingly Remarkable Value for this reach of the river. Therefore, while there may be localized disturbances to archeological resources, the Outstandingly Remarkable Value must be protected and enhanced.

The cumulative projects within and in the vicinity of the South Fork Bridge, when considered with Alternative 1, would result in local, long- term, negligible, beneficial impacts on archeological resources due to protection and enhancement of the Outstandingly Remarkable Value.

The Merced River Plan designates cultural resources as an Outstandingly Remarkable Value for this reach of the South Fork Merced River. Therefore, while there may be localized disturbances to archeological resources, the Outstandingly Remarkable Value must be protected and enhanced.

The cumulative projects within and in the vicinity of the South Fork Bridge, when considered with Alternative 1, would result in long- term, negligible, beneficial impacts on archeological resources due to the protection and enhancement of the Outstandingly Remarkable Value.

Section 106 Summary. Alternative 1 does not propose a federal undertaking as described in 36 CFR 800.16(y). Therefore, there is no potential to cause effects on National Register of Historic Places- eligible archeological resources.

Conclusions

There would be no change in the treatment and management of archeological resources in the South Fork Bridge project area as a result of Alternative 1. Bridge collapse and subsequent bank erosion that could occur has the potential to have a long- term, adverse effect on archeological resources in the vicinity. Due to the existence of a specific site within the project area, planning and compliance actions would be performed in accordance with stipulations in the park's 1999 Programmatic Agreement. Alternative 1 and the cumulative projects within and in the vicinity of the South Fork Merced River would result in a local, long- term, negligible, beneficial impact on archeological resources.

Impairment

Although archeological sites along the South Fork Merced River are key cultural resources within the Wawona area, the effect of Alternative 1 on archeological resources would primarily be localized, and the effect would not be considered severe. In addition, Alternative 1 would not change the treatment and management of any of these archeological resources. Sites throughout the remainder of the Wawona area would be unaffected. Therefore, Alternative 1 would not impair park resources or values.

Ethnography

Analysis

Under Alternative 1, there would be no change in the management and treatment of ethnographic resources in the Wawona area. Further bridge deterioration and eventual collapse would likely occur during a period of high flow. Bridge debris could dam the river, divert the river from its channel, or substantially erode the otherwise stable riverbanks in this area and remove vegetation gathered by American Indian people. Bridge materials washing downstream could affect ethnographically important vegetation during transport by floodwaters (removal of ethnographically important vegetation from physical contact with debris) or following deposition (covering of ethnographically important vegetation). Other ethnographic resources that may be affected (e.g., burials, village sites, etc.) are discussed under the archeological resource analysis. Important plant species observed in the vicinity of the South Fork Bridge included willows, sedges, grasses, and mosses, among other species.

It is assumed that the National Park Service would remove bridge debris, but activities associated with debris removal would not be conducted until low- flow conditions prevailed, which could be several months following a flood event. Debris removal activities could also result in area closures, for safety reasons, until the debris was removed. During this time, vegetation not impacted directly yet associated with traditional gathering would be unavailable for such uses. Debris removal would have local, short- term, negligible to minor, adverse effects to traditional plant gathering activities.

Although the channel and riverbanks of the South Fork Merced River would stabilize and natural recolonization would occur over time, this effect would possibly require 10 or more years. In the interim, erosion and erosion- related effects (e.g., bank instability and undermining streamside vegetation) would continue. These effects would have a local, long- term, negligible, adverse impact on vegetation. Overall, Alternative 1 would result in a local, negligible, adverse impact to traditional plant gathering activities in the immediate vicinity of the South Fork Bridge. The extent and quantity of plant species available to be gathered within the South Fork Merced River corridor below Wawona would be unaffected.

Summary of Alternative 1 Impacts

Alternative 1 would result in local, short- and long- term, negligible to minor, adverse impacts to ethnographic resources, i.e., plant species gathered by American Indian people in the immediate vicinity of the South Fork Bridge.

Cumulative Impacts

Cumulative effects to ethnographic resources are based on analysis of past, present, and reasonably foreseeable future actions in the Wawona area that relate to potential effects of this alternative. Ethnographic resources and their traditional cultural associations have been lost or damaged in the Wawona area through past development, visitor use, natural events, and widespread disruption of cultural traditions. However, Yosemite National Park retains many sites and resources of significance to local and culturally associated American Indians.

In general, past effects to the ethnographic resources within the South Fork Merced River are the result of thousands of years of human occupation and development. Development of facilities within the area may have disturbed or destroyed ethnographic resources, particularly prior to the advent of cultural resource laws and regulations enacted as early as the 1960s. Actions undertaken

may, therefore, have had a long- term, moderate, adverse, cumulative effect on ethnographic resources.

Reasonably foreseeable future actions in the region that may have an adverse cumulative effect on ethnographic resources include development- related projects, such as implementation of the employee housing at Wawona proposed in the *Yosemite Valley Plan*, expansion of the Wawona Campground, and the land exchange and subsequent relocation of facilities at the Seventh Day Adventist camp. Traditional gathering areas would be disturbed and modern development would be expanded at historic village areas. Implementation of this proposal of the *Yosemite Valley Plan* could have a local, long- term, adverse effects on ethnographic resources. The Merced River Plan provides a framework for decision making on future management actions within the South Fork Merced River corridor. The Merced River Plan designates ethnographic resources as an Outstandingly Remarkable Value for this reach of the river. Therefore, while there may be localized disturbances to ethnographic resources, the Outstandingly Remarkable Value must be protected and enhanced. The cumulative projects within and in the vicinity of South Fork Bridge, when considered with Alternative 1, would result in local, long- term, negligible, beneficial impacts on ethnographic resources due to protection and enhancement in accordance with the Outstandingly Remarkable Value designation.

Conclusions

Alternative 1 would result in local, short- and long- term, negligible, adverse impacts to traditionally gathered plant species in the immediate vicinity of the South Fork Bridge. Cumulative actions would have a local, long- term, negligible, beneficial effect on these resources within the South Fork Merced River corridor due to vegetation resource protection and management. Cumulative impacts have had a local, long- term, moderate, adverse, cumulative effect on traditionally gathered plant resources within the South Fork Merced River corridor due to historic development. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net long- term, minor, adverse effect on traditionally gathered plant distribution patterns in the vicinity of South Fork Bridge.

In general, there would be no change in the treatment and management of ethnographic resources as a result of Alternative 1. Any site- specific planning and compliance actions would be accomplished in accordance with stipulations in the 1999 Programmatic Agreement, and the park would continue to consult with culturally associated American Indian tribes under this agreement and the cooperative agreement for traditional uses. The cumulative projects in the Wawona area, in addition to Alternative 1, could result in a local, long- term, minor, adverse impact on ethnographic resources.

Impairment

The No Action Alternative would result in a local, short- and long- term, negligible, adverse impact to traditionally gathered plant species in the immediate vicinity of the South Fork Bridge. The effect of this alternative on vegetation resources would be localized and would not be considered severe. In addition, Alternative 1 would not change the treatment and management of ethnographic resources. The extent and quality of vegetation throughout the remainder of the South Fork Merced River corridor would remain unaffected. Therefore, Alternative 1 would not impair park resources or values.

Cultural Landscape Resources, Including Historic Sites and Structures

Analysis

Under Alternative 1, all cultural landscape resources, historic sites, and structures would continue to be managed as they are currently. The South Fork Bridge is not a contributing element due to changes made to the bridge that compromised its architectural integrity. The project poses no adverse impact to significant historic resources, such as designed landscapes and developed areas, historic buildings, and circulation systems (trails, roads, and bridges), throughout the remainder of the Wawona area.

Summary of Alternative 1 Impacts

There would be no change in the treatment and management of cultural landscape resources as a result of Alternative 1.

Cumulative Impacts

Cumulative impacts to resources located within a cultural landscape are based on analysis of past, present, and reasonably foreseeable future actions in Wawona in combination with potential effects of Alternative 1. Documentation from the Yosemite Valley area notes the disappearance of cultural landscape features that are reminders of the area's ranching, grazing, lumbering, and mining history, as well as early tourism. The South Fork Bridge is a definitive remnant of early transportation and tourism for the Wawona area.

Reasonably foreseeable future actions in the region that may have an adverse cumulative effect on cultural landscape resources include development- related projects, such as implementation of removal and construction activities such as Wawona employee housing and campground improvements associated with the *Yosemite Valley Plan*.

One of the above- mentioned projects would affect the qualities of the cultural landscape in the core Wawona area. As a result, Alternative 1 and the cumulative projects in the Wawona area would result in no change to cultural landscape resources.

Section 106 Summary. Alternative 1 does not propose a federal undertaking as described in 36 CFR 800.16(y). Therefore, there is no potential to cause effects on National Register of Historic Places- eligible cultural landscape resources.

Conclusions

There would be no change in the treatment and management of cultural landscape resources as a result of Alternative 1. Alternative 1 and the cumulative projects in the Wawona area would result in no change to the treatment and management of cultural landscape resources.

Impairment

Although cultural landscape resources along the South Fork Merced River are key to the cultural integrity of the Wawona area, this alternative would not change the treatment and management of cultural landscape resources. Cultural landscape resources throughout the remainder of the Wawona area would be unaffected. Therefore, Alternative 1 would not impair park resources or values.

Social Resources

Socioeconomics

Analysis

The South Fork Bridge would gradually deteriorate over the ensuing 10- year period, but would have a negligible adverse effect on socioeconomics until collapse occurred. Should deterioration become a concern in the short term, transfer of utility lines would be required, potentially providing some local income. A contractor would be needed to conduct bridge debris removal activities in response to an uncontrolled collapse of the South Fork Bridge. Local and regional, short- term, negligible, beneficial impacts to socioeconomics would occur for Wawona and/or Mariposa County, as a result of construction workers spending money on food, lodging, and other services, and by an influx of revenue to the construction/excavation operation selected to perform the clean- up work, as well as to the disposal/recycling facility used.

Summary of Alternative 1 Impacts

Local and regional, short- term, negligible, beneficial impacts to the socioeconomics of Wawona and/or Mariposa County are anticipated from construction workers spending money on food, lodging, gasoline, and other services, and by an influx of revenue to the construction/excavation operation selected to perform the clean- up work, as well as to the disposal/recycling facility used.

Cumulative Impacts

Cumulative effects to socioeconomics are based on analysis of past, present, and reasonably foreseeable future actions in Yosemite National Park, including the South Fork Merced River corridor and Yosemite Valley, with potential effects of this alternative. The general increase in visitation to Yosemite National Park, as well as management plans and projects involving the South Fork Merced River corridor and Yosemite Valley, could cumulatively affect socioeconomics.

As visitation continues to increase at Yosemite National Park, visitor spending would also increase at the concessions and privately owned operations in Wawona and in the park. This would have a local and regional, long- term, minor, beneficial effect on socioeconomics. Plans such as the Merced River Plan and *South Fork and Merced Wild and Scenic River Implementation Plan* generally seek to enhance the socioeconomic environment of the Merced and South Fork Merced River communities, including Wawona, in a manner consistent with Outstandingly Remarkable Values of the Wild and Scenic River. Coupled with the *Mariposa County General Plan*, these planning efforts are anticipated to have long- term, local and regional, negligible to minor, beneficial effects on the socioeconomic environment of Wawona and Mariposa County.

Construction activities associated with the South Entrance/Mariposa Grove Site Planning, employee housing at Wawona, and the Wawona Campground improvement projects would have local and regional, short- term, minor, beneficial effects on socioeconomics. These impacts would result from construction workers spending money on food, lodging, gasoline, and other services, as well as from an influx of revenue to construction contractors, material (e.g., concrete, steel) suppliers, and disposal/recycling facilities selected for use. These planning efforts and construction projects are anticipated to have a local and regional, short- and long- term, negligible to minor, net beneficial, cumulative effect on socioeconomics.

Conclusions

Local and regional, short- term, negligible, beneficial impacts to the socioeconomics of Wawona and/or Mariposa County are anticipated from construction workers spending money on food, lodging, gasoline, and other services, and by an influx of revenue to the construction/excavation operation selected to perform the clean- up work, as well as to the disposal/recycling facility used.

Local and regional, short- and long- term, negligible to minor, beneficial cumulative effects to socioeconomics would be anticipated from local and regional planning efforts, as well as the identified construction projects near the South Fork Bridge.

Impairment

The No Action Alternative would result in a negligible adverse effect on socioeconomics in the Wawona area. Socioeconomic impacts would not be considered severe and would not impair park resources or values.

Transportation

Analysis

Yosemite National Park currently experiences traffic delays and transportation issues on peak visitor days, particularly in Yosemite Valley. Gradual deterioration of the South Fork Bridge over the short term would have negligible adverse effects on transportation. Eventual, uncontrolled collapse of the South Fork Bridge under Alternative 1 would have local, short- term, negligible to minor, adverse impacts on transportation and traffic circulation within the park. Given that the temporary Bailey bridge is in place to divert traffic from the closed bridge, a collapse of the South Fork Bridge would not preclude visitors, park employees, or concessioners from using Wawona Road. However, bridge debris removal activities could cause traffic delays, anticipated to be 30 minutes or less, from trucks or other equipment using Wawona Road, or if the placement of removal equipment in the road is necessary. This would add a small amount to the minor to moderate congestion experienced on the busiest summer days.

Transit and tour bus services to the park from Fresno, through Wawona, as well as park tours from Yosemite Valley to Wawona and the Mariposa Grove of Giant Sequoias, could also be affected by traffic delays associated with bridge debris removal. These would be localized, short-term, negligible, adverse impacts, as VIA Adventures provides only one trip from Fresno per day, and the bus tour from Yosemite Valley to Wawona operates only during the summer.

The unpaved parking area in the southwest quadrant of the project site, which serves as overflow parking for the paved shuttle bus parking area, could be used for equipment staging in the event bridge debris removal is required. Closure of this parking lot to privately owned vehicles would have local, short- term, minor, adverse impacts on the availability of parking near the South Fork Bridge.

Summary of Alternative 1 Impacts

Eventual, uncontrolled collapse of the South Fork Bridge would be anticipated to result in local, short- term, negligible to minor, adverse impacts on transportation and traffic near the South Fork Bridge, including transit and tour bus operations. Should the unpaved overflow parking area

be required for equipment staging in response to bridge debris removal, closure of this lot for privately owned vehicles would have a local, short- term, minor, adverse impact on parking availability.

Cumulative Impacts

Cumulative effects to transportation are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor and Yosemite Valley with potential effects of this alternative.

Reasonably foreseeable construction activities that could further impact the transportation, traffic, and parking situation in the vicinity of the South Fork Bridge include the South Entrance/Mariposa Grove Site Planning, the Wawona Campground improvement, as well as implementation of several aspects of the *Yosemite Valley Plan*, specifically the construction of employee housing at Wawona and the increased use of public transportation through YARTS. Both activities would act to potentially increase traffic during certain periods of the day, as in the case of the new employee housing at Wawona and the Wawona Campground improvement and decrease traffic as in the case of increased use of public transportation. Delays related to equipment use or road closure for debris removal would have local, short- term (for the duration of the project), minor to moderate, adverse impacts on transportation.

However, projects implemented under the *Yosemite Valley Plan* could have a net beneficial effect on transportation, improving the attractiveness of alternative modes of transportation, and thereby reducing private automobile trips throughout the park. One general goal of the plan is to relieve congestion and to provide for alternative means of transportation, having a long- term, beneficial effect on transportation, traffic congestion, and parking availability. To the extent that transportation- related projects would replace automobile trips with bus trips, the anticipated beneficial effect would depend on ridership levels (and the corresponding number of automobile trips that would be avoided) and the technology selected for the buses.

The *Yosemite Valley Plan* has identified management actions to reduce the number of passenger vehicles within the park. The major actions identified include off- park parking areas, an expanded shuttle service, two- way traffic on currently one- way roads, road closures, and a 50% reduction of daily vehicle trips into the east valley. Locally, the closure of roads in the east valley may increase private vehicle traffic in the project area. The overall cumulative effect of these management actions, when employed, would result in regional, short- and long- term, minor to moderate, beneficial effects on transportation by reducing traffic congestion.

The gradual increase in annual visitation to the park would likely offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated transportation issues. Alternative 1 would, therefore, contribute to the local, short- term, minor to moderate, adverse, cumulative effect on the transportation, traffic, and parking situation near the South Fork Bridge.

Conclusions

Deterioration of the South Fork Bridge over a 10- year period would have a negligible, adverse effect on transportation. Eventual, uncontrolled collapse of the South Fork Bridge would be anticipated to result in local, short- term, negligible to minor, adverse impacts on transportation and traffic near the bridge site, including transit and tour bus operations. Should the unpaved overflow parking area be required for equipment staging in response to bridge debris removal, closure of this lot to privately owned vehicles would have a local, short- term, minor, adverse impact on parking availability.

The gradual increase in annual visitation to the park would likely offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated transportation issues. Alternative 1 would, therefore, contribute to the local, short- term, minor to moderate, cumulative, adverse effect on the transportation, traffic, and parking situation near the South Fork Bridge. Long- term, cumulative effects may be minor to moderate and could be beneficial or adverse depending on the extent to which public transportation eases traffic congestion or closures in the east valley encourage more private vehicles in this area.

Impairment

The No Action Alternative would result in a local, short- to long- term, minor to moderate, adverse impact from congested roads and lack of parking spaces. When placed in context with traffic congestion within the park on peak visitor days, transportation could impair park resources and values by negatively impacting visitor experiences and reducing the effectiveness of park operations.

Visitor Experience

Consistency with Visitor Experience and Resource Protection Provisions

This alternative does not include any actions that would be inconsistent with the interim VERP framework.

Recreation

Analysis

The South Fork Bridge would gradually deteriorate over the ensuing 10- year period and would be used by residents and tourists to occasionally provide a river crossing. However, further bridge deterioration would have a negligible, adverse effect on the visitor experience until it partially or fully collapsed. Under Alternative 1, eventual, uncontrolled bridge collapse would not preclude visitors from traveling from Yosemite Valley to Wawona, or from Wawona toward Yosemite Valley, given the availability and functionality of the temporary Bailey bridge. However, as discussed previously, visitors could be delayed in their travels due to bridge debris removal activities. In addition, failure of the bridge under Alternative 1 would affect river- dependent, active recreational uses, including swimming, wading, and fishing, that occur both in the immediate vicinity of the South Fork Bridge and downstream from the bridge. Depending on the manner in which the bridge failed, people recreating in the river (e.g., rafting or fishing in the river channel) could be exposed without warning to falling and/or tumbling bridge debris, potentially resulting in serious injuries or fatalities. The potential for injuries and/or fatalities in the event of a catastrophic bridge failure would have a short- term, local, moderate to major, adverse impact on these recreational visitor experiences.

Debris deposited in the river channel, increased sedimentation, and the release of raw sewage following failure of the bridge would temporarily degrade water quality and alter water flows, adversely affecting river conditions that currently support active recreational pursuits (e.g., swimming, and fishing) in the vicinity of the South Fork Bridge. The effects of bridge failure on water quality and flows would result in a local, short- term, moderate, adverse impact to active recreational activities in the immediate project vicinity, as well as downstream.

Summary of Alternative 1 Impacts

The potential for injuries and/or fatalities in the event of a catastrophic bridge failure would have a short- term, local, moderate to major, adverse impact on recreational visitor experiences. The effects of bridge failure on water quality and flows due to accumulations of debris and release of untreated sewage would result in a short- term, local, moderate, adverse impact to active recreational activities (e.g., swimming and fishing) in the immediate project vicinity, as well as downstream. The visually intrusive effects of the riverbank damage, vegetation loss, and the presence of debris (or construction equipment needed to remove the debris) would result in a short- term, local, minor, adverse impact on passive recreational activities such as sightseeing and photography. Temporary obstruction and/or closure of existing trails, as well as associated delays during clean- up operations after the bridge failed, would result in a short- term, local, minor, adverse effect on pedestrian, livestock, or winter use in the vicinity of the South Fork Bridge. Over the long term, no impacts on recreational resources would be anticipated.

Cumulative Impacts

Cumulative effects to recreation are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor with potential effects of this alternative.

As discussed in the Merced River Plan, zoning prescriptions for the Wawona area would allow as many recreational opportunities as exist now, but would alter some uses. The concession- run stable in Wawona is currently inconsistent with management zoning prescriptions of the Merced River Plan. The stable could, however, be relocated outside of the management zone. Therefore, this would be considered a short- term, local, negligible, adverse impact. However, beneficial effects are anticipated for recreation- related Outstandingly Remarkable Values within Wawona, including opportunities to experience a spectrum of river- related recreational activities, from nature study and photography to hiking. These long- term, local and regional, minor to moderate, beneficial effects would result from the protection of recreational opportunities while precluding new development that could degrade this range or availability of opportunities on a segment- wide basis.

Other cumulative beneficial effects are expected from the *South Fork and Merced Wild and Scenic River Implementation Plan*. This plan endeavors to limit or end consumptive uses such as grazing within the river corridor and calls for the formalization of camping as well as launch facilities for non- motorized watercraft. Implementation of these actions would have a long- term, local and regional, minor to moderate, beneficial effect by eliminating impacts where feasible (grazing is not currently allowed in the river corridor), concentrating impacts in areas able to withstand visitor use, and providing facilities (e.g., restrooms) to mitigate adverse effects associated with visitor use. The Wawona Campground project could also have a long- term, local, minor, beneficial effect on recreational resources in the park when implemented by providing greater access to camping.

The cumulative effects of Alternative 1, when considered with these past, present, and reasonably foreseeable future actions, are expected to be local, minor, adverse impacts in the short term as a result of the eventual, uncontrolled collapse of the South Fork Bridge. However, local and regional, long- term, minor to moderate, cumulative, beneficial impacts would be anticipated as a result of planning efforts for the South Fork Merced River corridor. The local, short- term, minor to moderate, adverse impact on river- related recreational activities resulting from bridge failure would be offset by the beneficial impacts of the cumulative projects.

Conclusions

The potential for injuries and/or fatalities in the event of a catastrophic bridge failure would have a local, short- term, moderate to major, adverse impact on recreational visitor experiences. The

effects of bridge failure on water quality and flows would result in a local, short- term, moderate, adverse impact to active recreational activities (e.g., swimming and fishing) in the immediate project vicinity, as well as downstream. The visually intrusive effects of the riverbank damage, vegetation loss, and the presence of debris (or construction equipment needed to remove the debris) would result in a local, short- term, minor, adverse impact on passive recreational activities such as sightseeing and photography. Temporary obstruction and/or closure of existing trails, as well as associated delays during clean- up operations after the bridge failed, would result in a local, short- term, minor, adverse effect on pedestrian, livestock, or winter use in the vicinity of the South Fork Bridge. Over the long term, no impacts on recreational resources would be anticipated.

The cumulative effects of Alternative 1, when considered with these past, present, and reasonably foreseeable future actions, are expected to be local, minor, adverse impacts in the short term as a result of the eventual, uncontrolled collapse of the South Fork Bridge. However, long- term, minor to moderate, local and regional, cumulative, beneficial impacts would be anticipated as a result of planning efforts for the South Fork Merced River corridor.

Impairment

The No Action Alternative would result in local, short- term, minor to moderate, adverse impacts on river- related recreation activities resulting from short- term deterioration and potential bridge failure. Although the South Fork Merced River and river- related recreation are important components of providing opportunities for enjoyment of the park, the effect of this alternative on recreation would be primarily localized to the South Fork Bridge area, limited in duration, and the effect would not be considered severe. The diversity and quality of river- related recreational opportunities throughout the remainder of Yosemite National Park would remain unaffected. Therefore, Alternative 1 would not impair river- related recreational opportunities.

Scenic Resources

Analysis

Under Alternative 1, the condemned and closed South Fork Bridge would remain in its existing condition without maintenance or repair. Because it has been closed, the bridge has been restricted for vehicle use by placing unsightly white concrete barriers at both termini. The white concrete barriers would continue to intrude visually upon the scenic character of the Wawona area. In addition, the condition of the bridge would continue to deteriorate until the bridge collapsed, adding to the now- visible signs of disuse. Due to the closure of the South Fork Bridge, a temporary Bailey bridge has been placed to carry traffic on Wawona Road, the placement is approximately 50 to 100 feet upriver. The Bailey bridge represents a major visual intrusion, because it is rectangular in shape, very tall, and its bright, silver- colored, galvanized, steel latticework is out of character for this rustic site. In its current state, the South Fork Bridge piers are surrounded by deep scour holes. The concrete surfaces of the bridge rails are pitted and becoming cracked, and the wingwalls and abutments are showing some deterioration. Further bridge deterioration would have a minor adverse effect on scenic resources until collapse occurred. Under Alternative 1, it is assumed that the bridge condition and continued deterioration would result in an uncontrolled failure, possibly in stages over a period of time. Bridge debris would litter the river channel of the South Fork Merced River, diminishing the scenic quality of the river channel where it was deposited.

Bridge failure could result in large pieces of the bridge gouging into banks, scouring the river bottom, and removing riparian vegetation. Under Alternative 1, it is assumed that debris deposited in the channel by the bridge collapse would be removed by the National Park Service as soon as

feasible. However, depending on the time of year and river conditions when the bridge failure occurred, completion of cleanup could be delayed for several months. Construction and transport equipment needed to remove the concrete, steel, and rock masonry debris from the river would temporarily increase the visual intrusion resulting from bridge failure. Following debris removal, riverbank damage, including tree removal for access, would be visible for several years. The continuing deterioration of the existing bridge, deposition of debris in the river following failure of the bridge, and operation of equipment to remove and transport debris would result in a local, short- term, minor, adverse effect on scenic resources of the Wawona area.

The long- term effect of the South Fork Bridge failure under Alternative 1 would be to remove a structure that, in its present condition, is a source of visual intrusion upon the scenic character of the Wawona area. As noted, the ongoing deterioration of the bridge piers, abutments, and façade are visible and detract from views of the natural landscape in which the bridge is an element. To exacerbate this situation is the presence of the visually intrusive temporary Bailey bridge, currently in place to carry Wawona Road traffic. Failure of the existing bridge would result in a local, long- term, minor, beneficial effect on scenic resources at Wawona.

Summary of Alternative 1 Impacts

The No Action Alternative would result in a local, short- term, minor, adverse impact to scenic resources in the vicinity of the South Fork Bridge, due to the visual intrusion effects of the bridge debris that would litter the South Fork Merced River following collapse; of the equipment present to remove debris; and of any damage to riverbanks and riparian vegetation. Prior to collapse of the bridge, the existing concrete barriers and deteriorating appearance of the bridge would continue to intrude upon the scenic character of Wawona. The ultimate removal of the South Fork Bridge under Alternative 1 due to failure would result in a local, long- term, minor, beneficial impact to scenic resources at Wawona.

Cumulative Impacts

Cumulative impacts to scenic resources are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor, in combination with potential effects of this alternative.

Scenic resources have been affected by numerous past actions since the park was designated. Alteration of park resources by Euro- American settlers to the area is evident at Wawona. Early settlers to the area farmed, ranched, logged, and constructed lodging and outbuildings. Water was diverted for farming and to dewater areas for development. Larger developments in the area include Wawona, the Wawona Hotel, Wawona Golf Course, Wawona Store, and the Pioneer Yosemite History Center.

Reasonably foreseeable future actions within the South Fork Merced River corridor are considered to have an overall beneficial effect on scenic resources. For example, the Merced River Plan protects river- related natural resources through the application of management elements, including the River Protection Overlay, management zoning, protection and enhancement of Outstandingly Remarkable Values, and implementation of a VERP framework. Obtaining land currently being used as the Seventh Day Adventist Camp near Wawona in exchange for land adjacent to the camp, but removed from the National Park Service Wilderness Boundary, along with redesign and construction of the existing and new campground facilities, would further provide for scenic resource preservation, protection, and management activities in the South Fork Merced River drainage in the project vicinity. Construction of employee housing and the South Entrance/Mariposa Grove planning projects would be completed with protection of scenic resources as a project goal. These construction projects would have local, short- term, minor, adverse impacts on scenic resources.

The cumulative activities within and in the vicinity of the South Fork Merced River corridor would result in a local, long- term, negligible to minor, beneficial, cumulative impact on scenic resources because of resource protection and management goals. Alternative 1 and the cumulative projects within and in the South Fork Merced River corridor would result in a local, long- term, negligible to minor, beneficial impact on scenic resources of the Wawona area.

Conclusions

The No Action Alternative would result in a local, short- term, minor, adverse impact to scenic resources in the vicinity of the South Fork Bridge due to the visual intrusion effects of the bridge debris that would litter the riverbed and possible damage to riverbanks and riparian vegetation following bridge collapse. Prior to bridge collapse, the white concrete barriers, deteriorating condition of the bridge, and the temporary Bailey bridge would continue to intrude upon the scenic character of the Wawona area resulting in a short- term, minor, adverse impact to scenic resources.

Cumulative actions would have a local, long- term, negligible to minor, beneficial cumulative effect on scenic resources within the South Fork Merced River corridor due to resource protection and management. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net local, long- term, negligible to minor, beneficial effect on scenic views. These beneficial effects on scenic resources would outweigh the short-term adverse effect associated with Alternative 1 and the cumulative development- related projects.

Impairment

The No Action Alternative would result in short- term adverse impacts to scenic resources within the vicinity of the South Fork Bridge. Although the South Fork Merced River is central to the scenery near Wawona, the short- term, adverse effect of this alternative on scenic resources would be primarily localized, temporary in duration, and would not be considered severe. Therefore, Alternative 1 would not impair scenic resources.

Park Operations and Facilities

Analysis

Under Alternative 1, the South Fork Bridge would remain in place without maintenance or repair. Although the bridge is blocked by concrete barriers, limited use of the bridge by visitors, hikers, and local residents walking across the structure to avoid the very narrow temporary bridge, does occur. For safety purposes, park operations staff is required to discourage such encroachments and prevent public access to the extent feasible. Over the long term, the bridge would continue to deteriorate and eventually fail, likely during high- flow conditions. Further bridge deterioration would have a minor effect to park operations and would require minor maintenance activities until the bridge collapsed. The collapsed bridge could block the flow of the river, which would be forced to flow around the bridge, causing substantial erosion on both banks of the river, as well as other adverse impacts. Park operations staff would be required to remove the bridge debris as soon as feasible under emergency conditions, and repair facilities that may be damaged (e.g., parking areas, etc.) around the bridge site.

Bridge collapse could result in a short- term (immediate) and dramatic increase in demand for the full range of park operations and emergency response staff to remove bridge debris and repair

damaged facilities around the bridge site. This could have a local, short- term, moderate to major, adverse impact on park operations.

The South Fork Bridge supports utility line conduits for water, sewage, electricity, and communications functions. Should an uncontrolled collapse of the South Fork Bridge occur, the lines would likely sever, and the following functions would be interrupted: (1) delivery of tertiary-treated gray water from the water treatment plant to the pump station for the Wawona Golf Course; (2) delivery of sewage from the Wawona Hotel and other operations to the wastewater treatment plant; (3) delivery of telephone and internet access to the Wawona Hotel; and (4) delivery of electricity to the pump station. However, these utility lines could be restored relatively quickly, given the availability of the temporary Bailey bridge for supporting the conduits. Therefore, local, short- term, moderate to major, adverse impacts to park operations and facilities would be anticipated.

Summary of Alternative 1 Impacts

Further bridge deterioration would have a minor, adverse effect on park operations and facilities, requiring periodic maintenance activities, mostly on utility lines, until bridge collapse occurred. Local, short- term, moderate to major, adverse impacts to park operations and facilities would result from the immediate and dramatic increase in demand for park operations and emergency response staff should the South Fork Bridge collapse. Local, short- term, moderate to major, adverse impacts to park operations and facilities would also be anticipated in the event of an uncontrolled collapse of the South Fork Bridge. This would result from the temporary disruption of utility lines carrying water, sewage, electricity, and communications functions.

Cumulative Impacts

Cumulative effects to park operations and facilities are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor and Yosemite Valley with potential effects of this alternative. The extent to which past, present, or reasonably foreseeable future projects could have a cumulative effect, when combined with this alternative is determined largely by whether such projects would affect park facilities or the demand for park operation services.

The *Merced Wild and Scenic River Comprehensive Management Plan* and the *Yosemite Valley Plan* seek to improve park operations and resources protection in the Merced and South Fork Merced Wild and Scenic River corridors. However, implementation of the plans would substantially increase demand on park operations and facilities in the short- term, during planning, repair, rehabilitation, construction, demolition, development of the VERP framework, and replacement of facilities. Implementation of these plans is expected to have local, short- term, moderate to major, adverse impacts on park operation services and facilities. In the long term, improvement to park facilities and operations is expected to result in a moderate beneficial impact, however, ever increasing visitor use and aging of these facilities will eventually negate the beneficial impacts.

Although project oversight and emergencies associated with the construction projects identified in Appendix D could require a full range of park operations and emergency response personnel, these projects would seek to improve park facilities. The projects, coupled with several others that would upgrade campgrounds and other facilities, would have a short- and long- term, minor, local, beneficial impact on park facilities. The upgrades would also seek to eliminate maintenance work associated with the deteriorating or failing facilities, resulting in a local, short- and long- term, minor, beneficial effect on park operations.

Overall, the past, present, and reasonably foreseeable future actions would have local, minor to moderate, adverse cumulative impacts, when considered with Alternative 1, because of the increased demand on park operations, services, and facilities in the short- and long- term.

Conclusions

Short- term, local, moderate to major, adverse impacts to park operations and facilities would result from the immediate and dramatic increase in demand for park operations and emergency response staff should the South Fork Bridge collapse. Short- term, local, moderate to major impacts to park operations and facilities would also be anticipated in the event of an uncontrolled collapse of the South Fork Bridge. This would result from the temporary disruption of utility lines carrying water, sewage, electricity, and communications functions.

Overall, the past, present, and reasonably foreseeable future actions would result in local, short- and long- term, minor to moderate, adverse, cumulative impacts, when considered with Alternative 1, because of the increased demand on park operations, services, and facilities. In the long term, improvement to park facilities is expected to result in a moderate beneficial impact; however, over time these benefits will be negated through increased visitor use and aging.

Impairment

Impairment of the South Fork Merced River is not addressed under park operations and facilities because this resource topic is peripheral to the protection of the river for future generations.

Alternative 2: Preferred Alternative

Alternative 2, the Replace South Fork Bridge alternative, would remove the condemned and closed 134- foot- long, three- span (with two piers in the riverbed), South Fork Bridge and replace it with a 150- foot- long, single- span bridge (no piers in the riverbed) on the same location and alignment. The new bridge would be 42- feet wide to accommodate wider travel lanes, shoulders, and a 5- foot- wide sidewalk. Alternative 2 would require transferring the utility lines (e.g., reclaimed water, sewage, high voltage electrical, and telecommunications) to the temporary Bailey bridge, removing the existing South Fork Bridge, constructing the new bridge and reattaching the utility lines, removing the temporary bridge and access road, and restoring disturbed areas of the site.

Alternative 2 would be enacted by removing the existing bridge in liftable segments during the low- flow portion of the year (September – December 2003). A temporary containment system would be installed to prevent small debris from demolition and cement slurry produced by concrete saws from entering the South Fork Merced River. However, not all demolition debris would be prevented from falling into the river, and masonry debris greater than 2- inches in diameter and metal debris of any size would be removed from the riverbed. A temporary structural support system consisting of scaffolding, jacks, or mechanical lifts, may be installed, if necessary, to prevent collapse of the bridge structure during demolition, as a construction platform for the new bridge, and as an anchor for the containment system.

During demolition and construction, traffic will flow relatively unimpeded and continue to use the temporary Bailey bridge that was constructed and placed in service in 1998. Following construction of the new bridge, the temporary Bailey bridge will be removed. All materials used for building the new bridge, demolition materials, and the dismantled temporary bridge would be stored at the Wawona District Materials Storage Area, near the South Fork Bridge site.

Natural Resources

Geology, Geologic Hazards, and Soils

Analysis

Bridge removal and replacement would have short- term, adverse, demolition and construction-related effects on soils (e.g., excavation, compaction). However, demolition and construction of the bridge would occur in a controlled manner (e.g., working within a delineated area and applying Best Management Practices such as providing erosion and sediment control measures). Alternative 2 would avoid the more extensive adverse effects of bank erosion and bank trampling due to bridge debris retrieval activities described under Alternative 1. Removing instream structures would minimize constriction of river flow, reducing the amount of water forced under the bridge and its velocity as it passes near and under the bridge opening. This would reduce bank erosion and impacts to soils when compared to Alternative 1. As a result, Alternative 2 would have a local, short- and long- term, negligible to minor, beneficial effect on soil resources. In addition, site restoration and stabilization would repair eroded areas and increase the protection of riverbanks, adjacent trails, and Wawona Road, resulting in a local, long- term, minor, beneficial impact on soils. Streambank erosion following bridge construction would result in local, short- and long- term, adverse effects to soils, which will be mitigated somewhat by construction Best Management Practices, site maintenance following construction, and revegetation. Alternative 2 would result in the construction of a new bridge designed in accordance with seismic (engineering) requirements; therefore, compared to Alternative 1, Alternative 2 would have a local, long- term, minor, beneficial impact regarding geologic hazards.

Summary of Alternative 2 Impacts.

Because Alternative 2 would avoid the more extensive adverse effects of bank destabilization, erosion, and soil compaction and loss due to uncontrolled bridge collapse and debris retrieval activities described under Alternative 1, Alternative 2 would have a local, short- and long- term, negligible, beneficial effect on soil resources. Alternative 2 would also result in local, long- term, minor, beneficial impact with respect to geologic hazards, because the bridge designed under Alternative 2 would be constructed to updated seismic engineering design standards. Site restoration and stabilization would repair eroded areas and increase the protection of riverbanks, adjacent trails, and Wawona Road, resulting in a local, long- term, minor, beneficial impact on soils.

Cumulative Impacts

The cumulative impact analysis for geology in Alternative 2 is the same as described under the No Action Alternative. Please see discussion of cumulative impacts under Alternative 1.

Past, present, and reasonably foreseeable future actions include the proposed expansion of the Wawona Campground and the land exchange to acquire portions of the Seventh Day Adventist Camp in Wawona adjacent to the National Park Service Wilderness. The campground expansion would affect soil resources northwest of the South Fork Bridge while the land exchange could result in protection of soil resources adjacent to wilderness areas. Alternative 2 and the cumulative projects would result in a local, long- term, minor, beneficial impact to soil resources and geologic hazards as Alternative 2 would incorporate updated seismic engineering design standards and avoid the more extensive adverse effects of soil erosion and bank destabilization

compared to Alternative 1. Soil erosion associated with the existing bridge results from deflection of flows off piers and encroaching abutments. The proposed structure would eliminate the effect of piers, reduce the impacts to soils caused by the abutments, and would have less effect because of wider abutment placement following construction. However, the presence of the abutments would continue to cause some associated soil erosion, resulting in a local, short- and long- term, minor, beneficial effect to soil erosion when compared with Alternative 1.

Conclusions

Alternative 2 would avoid the more extensive adverse effects of erosion and bank destabilization due to uncontrolled bridge collapse and debris retrieval activities described under Alternative 1; therefore, Alternative 2 would have a local, short- and long- term, negligible, beneficial effect on soil resources. Alternative 2 would result in the construction of a bridge designed to updated seismic engineering standards and would have a local, long- term, minor, beneficial impact compared to Alternative 1. Site restoration and stabilization would repair eroded areas and increase the protection of riverbanks, adjacent trails, and Wawona Road, resulting in a local, long- term, minor, beneficial impact on soils.

Alternative 2 and the cumulative projects would result in a local, long- term, minor, beneficial impact to soil resources. Alternative 2 would avoid the more extensive adverse effects of bank erosion compared to Alternative 1.

Impairment

Alternative 2 would result in beneficial effects on soil resources. Therefore, the effect of Alternative 2 would not impair geologic or soil resources.

Hydrology, Floodplains, and Water Quality

Under Alternative 2, the South Fork Bridge would not adversely influence river flow dynamics and hydrologic processes or present a potential flood hazard because the bridge would be removed, thus reducing the constriction on the natural flow of the river. Entire removal of the bridge piers would remove a flow restriction and return flows to more natural conditions.

Removal and replacement of the South Fork Bridge would help restore near active flood regime and hydrologic processes. The reconstruction of the South Fork Bridge would minimize constriction of river flow and improve the local, natural hydrologic regime. Alternative 2, when compared to the further bridge deterioration over the next 10 years described under Alternative 1, would result in local, long- term, minor, beneficial impacts on hydrologic processes that influence river morphology. Alternative 2 would have a local, long- term, minor, beneficial impact on the hydrologic processes that influence river morphology compared to Alternative 1, due to the avoidance of bank erosion and localized flooding associated with catastrophic bridge collapse.

Demolition and construction of the South Fork Bridge under Alternative 2 would cause minor amounts of sediment to be released into the river. The sediment would originate from the finer-grained material behind and beneath the existing and proposed abutments. As the abutments are reconstructed, these materials could be dislodged and released into the river. However, the amount of sediment released is expected to be minor and would not cause excessive turbidity downstream. Measures to control sediment sources using the proposed containment system (e.g., a tarp, net, or cage suspended beneath the bridge) would serve to capture the majority of sediment released during demolition and construction. Sediment sources include concrete dust generated during bridge cutting, concrete slurry during construction, friable concrete dislodged while the concrete sections are removed, soil used for abutment backfill, and steel fragments.

Sediment loads would increase temporarily should a structural support system be constructed to brace the bridge during demolition operations. If utilized, the system necessary to support the bridge and prevent uncontrolled collapse would need to be securely anchored to buttress the bridge and tolerate its weight upon collapse. Such a support system would require a substantial foundation, possibly consisting of vertical supports, mechanical lifts, and temporary foundation blocks. Construction and placement of a structure capable of supporting the weight of the bridge could disturb a considerable amount of the streambed and cause higher than normal turbidity. Constructing the support system with wheeled or tracked equipment in the river would place additional sediment in suspension. Temporary ramps built to place equipment in the river could also dislodge sediment from the riverbed and banks. However, the sediment dislodged during demolition and construction of the structural support system would only temporarily impact water quality within a localized area and the sediment would settle out downstream, particularly considering that demolition and construction are proposed to take place during periods of low flow. The sediment dislodged by construction associated with Alternative 2 is anticipated to be less than would occur under the No Action Alternative because demolition and reconstruction would occur in a controlled manner (e.g., within a delineated work area, during low flow conditions, with the application of Best Management Practices). Alternative 2 would avoid the more pronounced sedimentation effects described under Alternative 1. Therefore, Alternative 2 would have a local, short-term, negligible, beneficial effect on water quality compared to Alternative 1.

Water quality could be compromised if petroleum compounds were discharged from heavy equipment. The proposed Best Management Practices implemented under this alternative would ensure that petroleum releases from heavy equipment are minimized within the work area. Although there are potential sources of pollutants (e.g., sediment, petroleum products) associated with the removal and replacement of this bridge, its replacement would eliminate a long-term source of pollutants, including sediment from continued scouring and undermining of the bridge abutments and piers, as well as concrete and steel from long-term degradation of the bridge (or sudden collapse). As a result, Alternative 2 would have a local, short-term, negligible, beneficial effect on water quality compared to Alternative 1.

Summary of Alternative 2 Impacts

Under Alternative 2, the gradual deterioration of the South Fork Bridge described under Alternative 1, would not occur, resulting in local, long-term, minor, beneficial impacts to hydrologic processes. Alternative 2 would have local, short- and long-term, negligible to minor, beneficial impacts on hydrologic processes and water quality due to the avoidance of most bank erosion and localized flooding associated with catastrophic bridge collapse, reduced sedimentation, and controlled removal of the bridge compared to Alternative 1.

Cumulative Impacts

The cumulative impacts analysis for Alternative 2 is the same as described under Alternative 1. The beneficial and adverse cumulative effects would result in an overall local, long-term, minor, beneficial impact to hydrologic processes and water quality. The past, present, and reasonably foreseeable future actions considered cumulatively with Alternative 2, would have a local, long-term, minor, beneficial impact on hydrologic processes. The beneficial impacts associated with Alternative 2 would nominally contribute to overall beneficial cumulative impacts on hydrologic processes and water quality.

Conclusions

Alternative 2 would have local, short- and long- term, minor to moderate, beneficial impacts on hydrologic processes and water quality. Reconstruction of the South Fork Bridge would minimize constriction of river flow and improve the local natural hydrologic regime. In addition, the reconstruction would avoid bank erosion and localized flooding associated with catastrophic bridge collapse, reduce sedimentation, and provide for controlled removal of the bridge when compared to Alternative 1.

The past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor, considered cumulatively with Alternative 2, could have a local, long- term, minor, beneficial impact on hydrologic processes. The beneficial impacts associated with Alternative 2 would nominally contribute to overall beneficial cumulative impacts on hydrologic processes and water quality.

Impairment

Alternative 2 would have local, short- and long- term, negligible to minor, beneficial impacts on hydrologic processes and water quality. Alternative 2 would not impair hydrologic resources within the South Fork Merced River corridor.

Wetlands

Analysis

The South Fork Bridge currently impacts wetland and aquatic resources because of shading, scour pool formation around the piers and downstream from piers, and by riverbank erosion. Because bridge removal and construction activities will result in the same impacts to wetland and aquatic resources, both actions are considered in this analysis. Removal/construction of the South Fork Bridge would have local, short- term, adverse, demolition/construction- related effects, including cofferdam placement, to approximately 0.27 acre of aquatic habitat (90- foot- wide work zone). Within this work zone, approximately 0.03 acre of sparse scrub- shrub emergent wetland has become established along the low- flow channel. Most of the sparse wetland habitat is located between the existing bridge and the temporary bridge, continuing upriver from the temporary bridge. Emergent wetland and aquatic habitat described in the streambed of Angel Creek, downstream from the bridge would not receive demolition/construction- related impacts. Effects to wetland and aquatic habitats would result from heavy equipment used for demolition/construction activities, causing soil disturbance and compaction, generating dust, vegetation removal, root damage to adjacent vegetation, erosion, and potential introduction and spread of non- native species. Soil disturbance would result in the addition of silt, resuspension of sediment, or the introduction of construction equipment- related pollutants (e.g., fuels, lubricants, etc.) that could degrade the quality of wetland and aquatic habitats in the immediate vicinity of the bridge. Because demolition/construction would occur in a controlled manner within a designated/delineated work area, during low flow, and with the application of mitigation measures described in Chapter II (e.g., Best Management Practices), Alternative 2 would avoid the more pronounced adverse effects of debris retrieval activities described under Alternative 1 and would reduce the potential adverse impacts to wetland and aquatic habitats to a negligible intensity. The application of mitigation measures described in Chapter II, Best Management Practices, would further reduce the potential adverse impacts to wetland and aquatic habitats. Therefore, Alternative 2 would have a local, short- term, negligible, adverse effect on the riverbed environment.

Following abutment removal and replacement, minor regrading of the bridge construction site and the temporary bridge removal site, as well as revegetation, would be used to increase bank integrity. Alternative 2 would result in the removal of approximately 0.03 acre of sparse, scrub-shrub wetland habitat (dominated by sandbar willow), but with mitigation (salvage of willow shrubs and sedge clumps for reintroduction or replacement of willows using stem cuttings) would result in no net loss of wetland functions or values. Implementation of Alternative 2 would result in a site-specific, short-term, negligible to minor, adverse effect on wetland resources; and a site-specific, long-term, negligible to minor, beneficial effect on aquatic resources and riverine areas that provide habitat for a diversity of river-related species. The extent and quality of wetland, aquatic, riparian and other riverine habitats throughout the remainder of the South Fork Merced River corridor of the river would be unaffected.

Summary of Alternative 2 Impacts

Removal of the South Fork Bridge would restore the free-flowing condition of this stretch of the South Fork Merced River and return this reach to a more natural state, thereby enhancing its biological integrity. Alternative 2 would result in a site-specific, short-term, negligible to minor, adverse impact to sparse scrub-shrub wetland habitat of the low-flow channel during South Fork Bridge removal and replacement activities. Alternative 2 would also result in a site-specific, long-term, negligible to minor, beneficial effect on aquatic resources and riverine areas that provide habitat for a diversity of river-related species. The extent and quality of wetland, aquatic, riparian and other riverine habitats throughout the remainder of the South Fork Merced River corridor would be unaffected.

Cumulative Impacts

The direct and indirect effects of this alternative to wetlands are minimal; therefore, the cumulative impact analysis for wetland resources in Alternative 2 is the same as described under the No Action Alternative. Please see discussion of cumulative impacts under Alternative 1. Cumulative actions would have a local, long-term, negligible to minor, beneficial, cumulative effect on wetlands within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net local, long-term, negligible to minor, beneficial effect on wetland patterns.

Conclusions

Alternative 2 would result in a site-specific, short-term, negligible to minor, adverse effect on wetland resources within the South Fork Merced River low-flow channel. Alternative 2 would also result in a site-specific, long-term, negligible to minor, beneficial effect on aquatic, riparian, and other riverine resources that provide habitat for a diversity of river-related species. The extent and quality of wetland, riparian, aquatic, and other riverine habitats throughout the remainder of this river reach would be unaffected. Cumulative actions would have a local, long-term, negligible to minor, beneficial effect on wetlands within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net local, long-term, negligible to minor, beneficial effect on wetland patterns.

Impairment

With the incorporation of mitigation into the design of this alternative, Alternative 2 would result in a local, long-term negligible to minor, beneficial impact to wetlands, aquatic resources, and riverine areas that provide habitat for a diversity of river-related species. Alternative 2 would not impair wetland resources or values within the South Fork Merced River corridor.

Vegetation

Analysis

Removal/construction of the South Fork Bridge would have local, short- term, adverse, demolition/construction- related effects to native and non- native vegetation communities in the immediate vicinity of the South Fork Bridge. Effects would result from heavy equipment and demolition/construction activities, including cofferdam placement, and would include soil disturbance, soil compaction, dust, vegetation removal, root damage to adjacent vegetation, erosion, and potential introduction and spread of non- native species. Approximately 0.27 acre of aquatic habitat (e.g., river cobble with some attached aquatic moss), and 0.03 acre of sparse scrub- shrub wetland (e.g., sandbar willow and sedge providing less than 15% foliar cover) vegetation would be disturbed during demolition/construction activities.

Mature trees would be retained in the riparian area, to the extent practicable. Mature white alder, incense- cedar, and ponderosa pine are present adjacent to the existing bridge and could be adversely affected or removed during demolition/construction activities, although the National Park Service would take all reasonable precautions to avoid damaging the trees and their root structure. Approximately 0.75 acre of upland habitat dominated by native and non- native herbaceous species, and the existing temporary road that was constructed across an informal parking area devoid of vegetation could also be affected by construction/demolition activities. Because construction/ demolition activities would be conducted in a controlled manner (e.g., within a delineated work area, with the application of Best Management Practices, etc.), Alternative 2 would avoid the more pronounced adverse effects of debris retrieval activities described under Alternative 1. The application of mitigation measures described in Chapter II, Best Management Practices, would further reduce the potential adverse impacts to native vegetation to a negligible to minor intensity.

Removal of the South Fork Bridge would restore the free- flowing condition of the river and return this reach to a more natural state, enhancing its biological integrity. Following demolition/ construction activities, including temporary road and bridge removal, regrading and revegetation would diversify upland vegetation (e.g., using lupine and grass seed, etc.) and would increase riverbank and riparian vegetation integrity. Implementation of Alternative 2 would result in site- specific, long- term, negligible to minor, beneficial effects on vegetation, including aquatic, wetland, riparian, and upland types, and other riverine areas that provide habitat for a diversity of river- related species. The extent and quality of vegetation, including aquatic, wetland, riparian, and upland types, and other riverine habitats throughout the remainder of the South Fork Merced River corridor would be unaffected.

Summary of Alternative 2 Impacts

Removal of the South Fork Bridge would restore the free- flowing condition of the South Fork Merced River and return this reach to a more natural state, enhancing its biological integrity. Alternative 2 would result in a site- specific, long- term, negligible to minor, beneficial effect on vegetation, including aquatic, wetland, riparian, and upland types that provide habitat for a diversity of river- related species. Approximately 0.75 acre of sparse upland vegetation that includes non- native plant species and areas that have been paved would receive impacts during demolition/construction activities, resulting in site- specific, short- term, minor to moderate, adverse impacts due to soil disturbance and compaction. However, the project site would be revegetated, resulting in site- specific, long- term, minor, beneficial impacts to the vegetation resource.

Cumulative Impacts

Because the direct and indirect effects of this alternative are minimal, the cumulative impact analysis for vegetation in Alternative 2 is the same as described under the No Action Alternative. Please see discussion of cumulative impacts under Alternative 1.

Cumulative actions would have a long- term, minor, beneficial cumulative effect on vegetation within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net long- term, minor, beneficial effect on vegetation patterns within the South Fork Merced River corridor.

Conclusions

Removal of the bridge pieces and abutments would restore the free- flowing condition of the South Fork Merced River and return this portion of the river to a more natural state, thereby enhancing its biological integrity. Alternative 2 would result in a site- specific, long- term, negligible to minor, beneficial effect on vegetation, including aquatic, wetland, riparian, and upland types that provide habitat for a diversity of river- related species. The extent and quality of vegetation, including aquatic, wetland, riparian, and upland types, and other riverine habitats throughout the remainder of the South Fork Merced River corridor would be unaffected. Cumulative actions would have a long- term, minor, beneficial effect on vegetation within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net long- term, minor, beneficial effect on vegetation patterns.

Impairment

Alternative 2, with the incorporation of mitigation into the design, would restore this portion of the river to a more natural state, thereby enhancing its biologic integrity. Implementation of Alternative 2 would result in a local, long- term, negligible to minor, beneficial effect on vegetation, including aquatic, wetland, riparian, and upland types that provide habitat for a diversity of river- related species. Alternative 2 would not impair vegetation resources or values within the South Fork Merced River corridor.

Wildlife

Analysis

Localized, short- term, minor, temporary effects on wildlife could occur during demolition/ construction of the South Fork Bridge. Effects would be related to heavy equipment use and human intrusion and could include increased dust, soil disturbance and soil compaction, vegetation removal, noise, sedimentation, elevated turbidity, and decreased oxygen levels. These actions could result in direct losses of nest sites or burrows, and reproductive habitat for aquatic organisms and indirect effects through the disturbance of nesting birds or roosting bats. Because demolition/construction would be conducted in a controlled manner (e.g., within a delineated work area, during low- flow conditions, with the application of Best Management Practices), Alternative 2 would avoid the more pronounced adverse effects of debris retrieval activities described under Alternative 1. The application of a containment system and other mitigation measures, or Best Management Practices, would further reduce the potential adverse impacts to native fish and wildlife. Removal of the bridge piers would result in some loss of habitat diversity and structure for fish and aquatic organisms, because the scour holes will be filled by river cobble, resulting in a run or riffle habitat in a free- flowing river. However, pier removal would eliminate

an obstruction to fish movement in this reach of the South Fork Merced River. Some trees and shrubs that could provide perches and nest sites would be removed to accommodate demolition/construction activities. Minor regrading and revegetation following demolition/construction and removal of the temporary bridge would increase riverbank integrity, somewhat improving wildlife habitat and reducing the potential for long- term periodic aquatic habitat disturbances. Bat roosting habitat under the South Fork Bridge would be designed under the new bridge as a mitigation for wildlife impacts. Additional mitigation is described under the wetland and vegetation resource areas, as it relates to wildlife habitat avoidance, the minimization of impacts to wildlife habitat, and revegetation of disturbed portions of the project area. Implementation of Alternative 2 would result in a site- specific, long- term, minor, beneficial effect on wildlife and habitat for a diversity of river- related species. The extent and quality of wildlife habitats throughout the remainder of the South Fork Merced River corridor would be unaffected.

Summary of Alternative 2 Impacts

Removal of the South Fork Bridge would restore the free- flowing condition of the South Fork Merced River, returning this reach to a more natural condition and enhancing the biological integrity. Alternative 2 would result in a local, long- term, minor, beneficial effect on wildlife and habitat for a diversity of river- related species. Localized, negligible, short- term, adverse impacts are expected during bridge removal. The extent and quality of wildlife habitats throughout the remainder of the South Fork Merced River corridor would be unaffected.

Cumulative Impacts

Because the direct and indirect effects of this alternative are negligible to minor, the cumulative impact analysis for wildlife in Alternative 2 is the same as described under the No Action Alternative. Please see discussion of cumulative impacts under Alternative 1.

Cumulative actions would have a local, long- term, minor to moderate, beneficial, cumulative effect on wildlife within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net local, long- term, minor to moderate, beneficial effect on wildlife patterns in the South Fork Merced River corridor.

Conclusions

Removal of the South Fork Bridge would restore the free- flowing condition of the river and return this reach to a more natural state, thereby enhancing the biological integrity. Alternative 2 would result in a site- specific, long- term, minor, beneficial effect on wildlife and habitat for a diversity of river- related species. During bridge removal and construction, local, negligible, short- term, adverse impacts are expected to occur. The extent and quality of wildlife habitats throughout the remainder of the South Fork Merced River corridor would be unaffected. Cumulative actions would have a local, long- term, minor to moderate, beneficial, cumulative effect on wildlife within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net local, long- term, minor to moderate, beneficial effect on wildlife patterns.

Impairment

Given the incorporation of mitigation into the design of this alternative, Alternative 2 would result in local, long- term, negligible to minor, beneficial impacts to native wildlife and habitat for a diversity of river- related and adjacent upland species. Alternative 2 would not impair wildlife resources or values.

Special-Status Species

Special- status species known or likely to occur in the immediate vicinity of Wawona include the Wawona riffle beetle and nine species of bats (refer to Chapter III and Appendix C for additional information). The following subsections discuss impacts of Alternative 2 on these species and their habitat, as well as habitat considered suitable for other special- status species.

Analysis

Localized, short- term, minor effects on special- status species could occur during demolition/ construction of the South Fork Bridge. Effects would be related to heavy equipment and human intrusion and could include soil disturbance and soil compaction, increased dust, vegetation removal, noise, sedimentation, elevated turbidity, and decreased oxygen levels.

Following demolition/construction activities, including temporary road and bridge removal, regrading and revegetation would increase riverbank and riparian vegetation integrity, somewhat improving habitat for raptors, passerine birds, and the Wawona riffle beetle at this site. Implementation of Alternative 2 would result in a site- specific, long- term, negligible, beneficial effect on the extent and quality of river- related species. The extent and quality of river- related species throughout the South Fork Merced River corridor would be unaffected.

Special-Status Species of Invertebrates: Amphibians. Bridge removal would have localized, short- term, minor, adverse effects on the Wawona riffle beetle; potential habitat for the California red- legged frog, northwestern and southwestern pond turtles, and the foothills yellow- legged frog. Effects would be related to heavy equipment and human intrusion and could include vegetation removal, decreased oxygen levels, the addition of silt, resuspension of sediment, or the introduction of pollutants (i.e., fuels, lubricants). These actions could result in direct losses of individuals or habitat for these species at the project site and downstream of the bridge; however, they will occur at a time period when Wawona riffle beetles are not present. The application of mitigation measures described in Chapter II (e.g., carry out demolition/ construction activities during a low- water period, move or work in or adjacent to aquatic habitats, fueling and maintenance of vehicles and equipment outside aquatic habitat, minimize area of construction, minimize equipment operation in the river, reduce stream sediment loading, etc.) would reduce the potential adverse impacts to individuals or habitat of these special- status species to a negligible intensity.

Removal of the South Fork Bridge would restore the free- flowing condition of the South Fork Merced River and return this portion of the river to a more natural state, thereby enhancing the biological integrity of this reach for special- status invertebrates and amphibians.

Special-Status Species of Bats. Bridge removal activities would have a local, short- term, minor, adverse effect on special- status bats in the immediate vicinity of Wawona. Effects would be related to heavy equipment and human intrusion and could include disruption of breeding activities (e.g., bats breed in autumn from August to October) or the possible direct destruction of bat roosts (e.g., trees, bridge structure). The application of mitigation measures described in Chapter II (e.g., Best Management Practices, limitation of bridge removal activities to outside the breeding season for special- status bats) and inclusion of a bridge design that allows bat roosting and would reduce the potential adverse impacts to special- status bats to a negligible intensity. This timing would coincide with U.S. Army Corps of Engineers Section 404 permit requirements for demolition and construction activities to occur during a low- water time of year. Further, mitigation will include a bat survey by a qualified researcher prior to bridge demolition. In

addition, bat roosting habitat under the new bridge and revegetation would have a local, long-term, minor to moderate, beneficial effect on habitat for special- status bats at this location.

Special- Status Species of Birds and Mammals. Bridge removal activities would have a short- term, negligible to minor, adverse effect on special- status birds and mammals in the immediate vicinity of Wawona. Effects would be related to heavy equipment use and could include increased dust, vegetation removal, and noise. These actions could result in direct loss of next/perch sites, and indirect effects of disturbance to nesting or foraging special- status birds. These impacts would also be anticipated for the Pacific fisher, the only special- status mammal considered in detail, which uses trees in coniferous forests for hunting or escaping predators. The application of mitigation measures described in Chapter II, Best Management Practices, would further reduce the potential adverse impacts to vegetation that may support special- status birds or mammals.

As described under the impacts to vegetation for Alternative 2, long- term benefits are anticipated for wetland, riparian, and upland habitats. The benefit to these habitats would result in long-term, negligible to minor, beneficial effects to special- status bird and mammal species. The extent and quality of habitat for these species throughout the remainder of the South Fork Merced River corridor would be unaffected.

Special- Status Species of Plants. Removal/construction of the South Fork Bridge would have local, short- term, negligible, adverse effects on habitat suitable for special- status plants, including Small's southern clarkia, Rawson's flaming trumpet, and the Yosemite lewisia. Approximately 0.75 acre of upland habitat and 0.27 acre of sparse scrub- shrub wetland that may support habitat for these species are anticipated to be disturbed. The upland area is dominated by native and non- native herbaceous species and includes the existing temporary road that was constructed across an informal parking area devoid of vegetation. The wetland area is dominated by willows and sedges (approximately 15% foliar cover). Effects would result from heavy equipment and demolition/construction activities, including cofferdam placement, and would include soil disturbance, soil compaction, dust, vegetation removal, root damage to adjacent vegetation, and potential introduction and spread of non- native species. Because construction/demolition activities would be conducted in a controlled manner (e.g., within a delineated work area and with the application of Best Management Practices and mitigation measures described in Chapter II, Best Management Practices), Alternative 2 would avoid the more pronounced adverse effects of debris retrieval activities described under Alternative 1.

As described under the impacts to vegetation for Alternative 2, long- term benefits are anticipated for wetland, riparian, and upland habitats. The benefit to these habitats would result in long-term, negligible to minor, beneficial effects to potential habitat for special- status plants. The extent and quality of habitat for these species throughout the remainder of the South Fork Merced River corridor would be unaffected.

Summary of Alternative 2 Impacts

Local, negligible to minor, short- term, adverse impacts to special- status species are expected during bridge removal. Removal of the South Fork Bridge would restore the free- flowing condition of the river and return this reach to a more natural state, thereby enhancing the biological integrity for the Wawona riffle beetle, and resulting in a local, long- term, minor to moderate, beneficial effect on habitat for special- status bats at this location. Local, long- term, negligible to minor, beneficial effects on habitat for special- status birds, mammals, and plants are also anticipated.

Cumulative Impacts

The cumulative impact analysis for special- status species in Alternative 2 is the same as described under the No Action Alternative. Please see discussion of cumulative impacts under Alternative 1.

Cumulative actions would have a local, long- term, moderate, beneficial, cumulative effect on special- status species within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net local, long- term, minor to moderate, beneficial effect on habitat for the Wawona riffle beetle and special- status species of bats, birds, mammals, and plants.

Conclusions

Removal of the South Fork Bridge would restore the free- flowing condition of the river and return this reach to a more natural state enhancing the biological integrity of the reach for the Wawona riffle beetle and resulting in a local, long- term, negligible to minor, beneficial effect on habitat for other special- status species at this location. Alternative 2 would result in site- specific, short- term, negligible, adverse, effects during bridge removal. Cumulative actions would have a local, long- term, moderate, beneficial, cumulative effect on special- status species within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net local, long- term, moderate, beneficial effect for the Wawona riffle beetle and special- status bats, birds, mammals, and plants within this river reach.

Impairment

Given the incorporation of mitigation measures into the design of this alternative, Alternative 2 would result in a local, long- term, negligible to minor, beneficial impact to the Wawona riffle beetle and other special- status species. Alternative 2 would not impair special- status species.

Air Quality

Analysis

Under Alternative 2, local pollution sources within the park, and regional sources upwind of the park, would continue to have an impact on air quality at Yosemite, as discussed in Alternative 1.

Over the short term, the South Fork Bridge removal/construction, including removal of the temporary Bailey bridge, would result in local, negligible, adverse impacts to air quality. Effects would be primarily related to the use of equipment, dust, and vehicle trips to and from the demolition/ construction site and exhaust emissions. As described for bridge debris removal in Alternative 1, demolition/construction activities would temporarily affect pollutant concentrations in the vicinity of the South Fork Bridge, but would not affect the attainment area status. Air quality impacts would be primarily from: (1) fugitive dust associated with the demolition/construction and vehicle travel over paved surfaces heavily laden with earthen materials; (2) tailpipe emissions associated with demolition/construction equipment; and (3) emissions of ozone precursors and carbon monoxide from the use of diesel- powered equipment. Dust emissions would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather. These impacts would be mitigated through Best Management Practices described for the Preferred Alternative in this environmental assessment. Because demolition/construction would occur in a controlled manner, working within a delineated area and using Best Management Practices, Alternative 2 would avoid the more extensive adverse

effects of bridge debris removal activities described under Alternative 1. Therefore, Alternative 2 would have a local, short- term, negligible, beneficial effect on air quality compared to Alternative 1. Alternative 2 would not result in a long- term impact to air quality as the construction related activities would be short term and the overall traffic flow would be restored.

At the South Fork Bridge site during construction activities, automobile and recreational vehicle traffic would continue to be slowed due to the speed and size limitations of the existing temporary Bailey bridge, resulting in negligible to minor, short- term, adverse impacts on local air quality, depending on the time of year (i.e., more traffic exists during the summer months, causing more congestion), meteorological conditions (e.g., wind speed, wind direction), and the type of vehicles (automobile versus recreational vehicle) crossing the temporary bridge. However, when the new South Fork Bridge is complete, and replaces the temporary Bailey bridge, traffic would be able to pass through this area more smoothly, at a higher rate of speed. This would result in local, long- term, negligible to minor, beneficial effects on air quality.

Summary of Alternative 2 Impacts

Because demolition/construction of the South Fork Bridge (including removal of the temporary Bailey bridge) would occur in a controlled manner, working within a delineated area, Alternative 2 would avoid the more extensive adverse effects of bridge debris removal activities described under Alternative 1. Therefore, Alternative 2 would have a local, short- term, negligible to minor, beneficial effect on air quality compared to Alternative 1. Short- term, local, negligible to minor, adverse impacts would also be anticipated from vehicles having to slow down to cross the temporary Bailey bridge. Alternative 2 would not result in a long- term impact to air quality as traffic movement would be restored. The long- term impact would be local, negligible to minor, and beneficial to air quality.

Cumulative Impacts

The cumulative impact analysis for air quality in Alternative 2 is the same as described under the No Action Alternative. Please see the discussion of cumulative impacts under Alternative 1 for a detailed description.

The *Yosemite Valley Plan* has identified management actions to reduce the number of passenger vehicles within the park. The major actions identified include off- park parking areas, an expanded shuttle service, two- way traffic on currently one- way roads, road closures, and a 50% reduction of daily vehicle trips to the east valley. YARTS is a collaborative effort to improve transportation options, reduce reliance on automobiles and improve regional air quality. The overall cumulative effect of these management actions, when employed, would result in local and regional, short- and long- term, beneficial effects to air quality.

Considered with the adverse impacts associated with regional air quality influences, the cumulative projects would have a local, long- term, minor beneficial effect on air quality near the South Fork Bridge. The short- term, adverse effects associated with demolition/construction activities under Alternative 2 would not offset the long- term, beneficial effects of the cumulative projects.

Conclusions

Local, short- term, negligible to minor, adverse impacts are anticipated from demolition/construction of the South Fork Bridge, as a result of demolition/construction activities (including removal of the temporary Bailey bridge) and increased congestion from vehicles slowing down to cross the temporary Bailey bridge. However, in the long- term, the project would have local,

negligible to minor, beneficial impacts on air quality, as the new South Fork Bridge would alleviate some congestion, allowing vehicles to travel smoothly through the area at a higher speed.

Considered with the adverse impacts associated with regional air quality influences, the cumulative projects would have a local, long- term, minor, beneficial effect on air quality near the South Fork Bridge. The short- term, adverse effects associated with demolition/construction activities under Alternative 2 would not offset the long- term, beneficial effects of the cumulative projects.

Impairment

Alternative 2 would result in negligible effects to air quality. Air quality impacts would be small and would not impair park resources or values.

Noise

Analysis

Over the short term, the South Fork Bridge removal/construction, as well as removal of the temporary Bailey bridge, would result in local, short- term, minor to moderate, adverse impacts to the ambient noise environment. Bridge cutting (concrete saw) and removal activities would generate the highest noise levels. Demolition/construction- related material haul trips would also raise ambient noise levels along haul routes. Operation of heavy- duty equipment at the site during demolition/ construction (including removal of the temporary Bailey bridge) could generate substantial amounts of noise and would occur within close proximity to visitor use areas. Other sensitive land uses (e.g., campgrounds and picnic areas, the Wawona Hotel, the Pioneer Yosemite History Center, and the Wawona Golf Course) located farther from the site would be affected to a lesser extent. Noise at the site would vary depending on a number of factors, such as the number and types of equipment in operation on a given day, usage rates, the level of background noise in the area, and the distance between sensitive uses and the construction site.

Alternative 2 would avoid the more extensive, adverse noise impacts associated with bridge debris removal activities under Alternative 1, by working within a delineated area. Therefore, Alternative 2 would have a local, short- term, negligible, beneficial effect on the ambient noise environment when compared to Alternative 1.

At the South Fork Bridge site, automobile and recreational vehicle traffic would continue to be slowed due to the speed and size limitations of the existing temporary Bailey bridge. This can cause negligible to minor, short- term, adverse impacts on the local ambient noise environment, depending on the time of year (i.e., more traffic exists during the summer months, causing more congestion), meteorological conditions (e.g., wind speed, wind direction), and the type of vehicles (automobile versus recreational vehicle) crossing the temporary bridge. However, when the new South Fork Bridge is complete, and replaces the temporary Bailey bridge, traffic would be able to pass through this area more smoothly, at a higher rate of speed. This would result in local, long- term, negligible to minor, beneficial impacts on the local noise environment, depending on the time of year, meteorological conditions, and types of vehicles crossing the new bridge.

Over the long term, the acoustical environment in the vicinity of the South Fork Bridge would be shaped largely by natural sources of sound (e.g., rushing water and wind), interspersed with human- caused sources of noise (e.g., motor vehicles, talking and yelling, and aircraft).

Summary of Alternative 2 Impacts

Although demolition/construction of the South Fork Bridge (including removal of the temporary Bailey bridge) is anticipated to have short- term, local, adverse impacts on the noise environment, Alternative 2 would avoid the more extensive adverse noise impacts associated with bridge debris removal activities under Alternative 1 by working within a delineated area. Therefore, Alternative 2 would have a local, short- term, negligible, beneficial effect on the ambient noise environment when compared to Alternative 1.

Cumulative Impacts

The cumulative impact analysis for noise in Alternative 2 is the same as described under the No Action Alternative. Please see the discussion of cumulative impacts under Alternative 1 for a detailed description.

The *Yosemite Valley Plan* has identified management actions to reduce the number of passenger vehicles within the park. The major actions identified include off- park parking areas, an expanded shuttle service, two- way traffic on currently one- way roads, road closures, and a 50% reduction of daily vehicle trips to the east valley. The overall cumulative effect of these management actions, when employed, would result in local and regional, short- and long- term, moderate, beneficial effects related to noise generation. Short- term construction projects associated with the *Yosemite Valley Plan*, such as construction of employee housing and improvements at Wawona Campground will likely result in minor to moderate, adverse impacts to noise.

The gradual increase in annual visitation to the park as well as the potential for increased passenger vehicle traffic in this area as a result of road closures elsewhere would likely offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated noise. Alternative 2 would, therefore, contribute to the local, short- and long- term, minor, adverse, cumulative effect on the noise environment near the South Fork Bridge. The local, long- term, beneficial impacts of Alternative 2 on the ambient noise environment would not offset the cumulative adverse effects.

Conclusions

Although demolition/construction of the South Fork Bridge (including removal of the temporary Bailey bridge) is anticipated to have short- term, local, adverse impacts on the noise environment, Alternative 2 would avoid the more extensive adverse noise impacts associated with bridge debris removal activities under Alternative 1, by working within a delineated area. Therefore, Alternative 2 would have a local, short- term, negligible, beneficial effect on the ambient noise environment when compared to Alternative 1.

The gradual increase in annual visitation to the park would likely offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated noise. Alternative 2 would therefore contribute to the local, short- and long- term, minor, adverse, cumulative effect on the noise environment near the South Fork Bridge. The local, long- term, beneficial impacts of Alternative 2 on the ambient noise environment would not offset the cumulative adverse effects. The gradual increase in annual visitation to the park would likely offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated noise. Alternative 2 would, therefore, contribute to the local, short- and long- term, minor, adverse, cumulative effect on the noise environment near the South Fork Bridge. The local, long- term, beneficial impacts of Alternative 2 on the ambient noise environment would not offset the cumulative adverse effects. However, when the *Yosemite Valley Plan* becomes fully

implemented and daily vehicle trips are reduced by 50% on the busiest days, the plan would result in local and regional, short- to long- term, moderate, beneficial impacts to the noise environment.

Impairment

Alternative 2 would result in negligible beneficial effects on the ambient noise environment. Noise impacts would not be considered severe and would not impair park resources or values.

Cultural Resources

Archeological Resources

Analysis

Archeological resources in the Wawona area include historic and prehistoric resources. Archeological resource site CA- MRP- 171/H, which contains prehistoric and historic artifacts occurs within the immediate project area. If ground- disturbing activities are confined to the defined area of potential effect, moderate adverse effects to archeological resources would be expected. However, data recovery has previously been undertaken for the area of potential effect and reduces the effect of bridge replacement to negligible to minor. If ground- disturbing activities are confined to the defined area of potential effect, there would be no new adverse effects to archaeological resources.

Removal/replacement of the South Fork Bridge could unearth sensitive prehistoric and possibly historic archeological resources, although there is low probability of unknown archeological resources or prehistoric or historic archeological resources in the project area. Ground- disturbing activities could result in a local, long- term, minor, adverse impact to unknown archaeological resources within the project area. If discovered, data recovery would be conducted for these resources. Minor revegetation would increase bank integrity and decrease potential erosion, therefore, avoiding adverse erosion- related effects that would result under Alternative 1. Any actions would be performed in accordance with stipulations in the park's 1999 Programmatic Agreement. Archeological resources throughout the remainder of the Wawona area would be unaffected.

Summary of Alternative 2 Impacts

Alternative 2 could have a local, long- term, minor, adverse impact to unknown archeological resources due to ground- disturbing activities. Any and all actions would be performed in accordance with stipulations in the park's 1999 Programmatic Agreement.

Cumulative Impacts

Because the direct and indirect effects of this alternative are minimal, the cumulative impact analysis for archeological resources in Alternative 2 is the same as described for the No Action Alternative. Essentially, Alternative 2 and the cumulative projects with and in the vicinity of the South Fork Merced River could result in a local, long- term, negligible, beneficial impact on archeological resources.

Section 106 Summary. The potential level of adverse effects associated with the Preferred Alternative would be minimized or avoided through the use of archeological and American Indian monitors and implementation of other mitigating measures, as necessary. All mitigation would be

implemented in consultation with the California State Historic Preservation Office and American Indian tribes, as appropriate. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5), the National Park Service determined there would be no adverse effect on archeological resources in the project area.

Conclusions

Alternative 2 could have a local, long- term, negligible to minor, adverse impact to archeological resources due to ground- disturbing activities. Any actions would be performed in accordance with stipulations in the park's 1999 Programmatic Agreement. The reason that this impact is considered negligible to minor is because at this stage the archeological site (CA- MRP- 171H) has already been the subject of a data recovery plan implemented under the guidance of the California State Historic Preservation Office and there is a low probability that other archeological resources are in the project area.

Impairment

Disturbance of historic and prehistoric archeological resources could take place during bridge demolition and construction under Alternative 2. This action would be subject to site- specific planning and compliance and would be undertaken in accordance with stipulations in the park's 1999 Programmatic Agreement. Therefore, this alternative would not impair park resources or values.

Ethnographic Resources

Analysis

There are traditionally gathered plant species present in the South Fork Bridge locality, including willows, sedges, mosses, and grasses among other species. Under Alternative 2, the impacts would be less than those described under the No Action Alternative, because downstream vegetation impacts would be averted. Overall, Alternative 2 would result in a local, negligible, adverse impact to traditional plant gathering activities in the immediate vicinity of the South Fork Bridge. The National Park Service would continue to consult with culturally associated groups throughout the environmental process.

Summary of Alternative 2 Impacts

Alternative 2 would result in local, short- and long- term, negligible, adverse impacts to ethnographic resources, i.e., plant species gathered by American Indian people, in the immediate vicinity of the South Fork Bridge.

Cumulative Impacts

The cumulative impact analysis for ethnographic resources, under Alternative 2, is related to traditionally gathered plant species and is the same as described under the No Action Alternative. Please see discussion of cumulative impacts under Alternative 1. The cumulative projects in the South Fork Merced River corridor would result in a local, long- term, negligible to minor, adverse impact on ethnographic resources due to the disturbance of such resources. Alternative 2 actions would not provide additional contributions to this impact.

Conclusions

Alternative 2 would result in local, short- and long- term, negligible, adverse impacts to traditionally gathered plant species in the immediate vicinity of the South Fork Bridge. Cumulative actions would have a local, long- term, negligible, beneficial effect on these resources within the South Fork Merced River corridor due to vegetation resource protection and management. Past cumulative actions have had a local, long- term, moderate, adverse, cumulative effect on traditionally gathered plant resources within the South Fork Merced River corridor due to historic development. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net long- term, minor, adverse effect on traditionally gathered plant distribution patterns.

In general, there would be no change in the treatment and management of ethnographic resources as a result of Alternative 2. Any site- specific planning and compliance actions would be accomplished in accordance with stipulations in the 1999 Programmatic Agreement and the park would continue to consult with culturally associated American Indian tribes under this agreement and the cooperative agreement for traditional uses. The cumulative projects in the Wawona area, in addition to Alternative 2, could result in a local, long- term, minor, adverse impact on ethnographic resources.

Impairment

Alternative 2 would not have a direct, indirect, or cumulative impact on ethnographic resources or their treatment and management. This alternative would result in a local, long- term, negligible, beneficial effect on traditionally gathered plant species in the immediate vicinity of the South Fork Bridge. Ethnographic resources throughout the Wawona area would not be affected. This alternative would not impair park resources or values.

Cultural Landscape Resources, Including Historic Sites and Structures

Analysis

Under Alternative 2, all cultural landscape resources, historic sites, and structures would continue to be managed as they are currently. The South Fork Bridge is not a contributing element due to changes made to the bridge that compromised the original architecture. The project poses no adverse impact to significant historic resources, such as designed landscapes and developed areas, historic buildings, and circulation systems (trails, roads, bridges) throughout the remainder of the Wawona area.

Summary of Alternative 2 Impacts

Nationally significant historic resources, such as designed landscapes and developed areas, historic buildings, and circulation systems (trails, roads, and bridges), throughout the Wawona area would be unaffected by project activities. There would be no change in the treatment and management of cultural landscape resources as a result of Alternative 2.

Cumulative Impacts

Because there are no direct or indirect effects of Alternative 2, the cumulative impact analysis for cultural landscape resources under this alternative is the same as described under Alternative 1. Reasonably foreseeable future actions in the region that may have an adverse cumulative effect on cultural landscape resources include development- related projects, such as implementation of

removal and construction activities associated with the Wawona Campground improvements and employee housing construction.

None of these projects are expected to affect the qualities of the cultural landscape in the core Wawona area. The cumulative projects in the Wawona area would result in no change in the cultural landscape resources.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5), the National Park Service determined there would be no adverse effect to the structures at cultural landscape resources. The overall characteristics and integrity of the landscape would be retained.

Conclusions

There would be no change to cultural landscape resources as a result of Alternative 2 or the cumulative effect of other projects and Alternative 2.

Impairment

Alternative 2 would result in a local, long- term, minor, beneficial impact to historic resources. Consequently, Alternative 2 would not impair park resources or values.

Social Resources

Socioeconomics

Analysis

Under Alternative 2, direct spending on labor and equipment would result, and a contractor would be needed to conduct the demolition and construction of the South Fork Bridge, including removal of the temporary Bailey bridge. Local and regional, short- term, negligible to minor, beneficial impacts to socioeconomics would occur for Wawona and/or Mariposa County as a result. These impacts would result from construction workers acquiring food, lodging, gasoline, and other services, as well as from revenue paid to construction contractors, material (e.g., concrete, steel) suppliers, and disposal/recycling facilities selected for use. These beneficial effects would be greater under Alternative 2, when compared to Alternative 1, because: (1) more workers would be required for a longer period of time for bridge demolition and construction, including removal of the temporary Bailey bridge; (2) material suppliers are not needed in the No Action Alternative; and (3) an increase in materials for disposal/recycling would likely be associated with Alternative 2.

Summary of Alternative 2 Impacts

Alternative 2 would have direct and indirect economic impacts, which would result in a local and regional, short- term, negligible to minor, beneficial impact to the socioeconomics of Wawona and/or Mariposa County.

Cumulative Impacts

The cumulative impact analysis for socioeconomics under Alternative 2 is similar to that described under the No Action Alternative. Please see the discussion of cumulative impacts under Alternative 1 for a detailed description. Alternative 2 would contribute to all of the identified cumulative plans and projects in the South Fork Merced River corridor and Yosemite Valley, resulting in local, short- and long- term, minor to moderate, beneficial impacts to socioeconomics. Alternative 2 would contribute to this local, short- term, beneficial impact due to temporary spending on bridge removal and construction activity.

Conclusions

Alternative 2 would have direct and indirect economic impacts, which would result in a regional, short- term, negligible to minor, beneficial impact to the socioeconomics of Wawona and/or Mariposa County. Beneficial impacts are anticipated from construction workers acquiring food, lodging, gasoline, and other services, as well as from an influx of revenue to construction contractors, material (e.g., concrete, steel) suppliers, and disposal/recycling facilities selected for use. These beneficial effects would be greater under Alternative 2 than under Alternative 1.

The cumulative projects within and in the vicinity of Yosemite National Park would result in a local, long- term, negligible, beneficial impact to the regional economy, and a local, short- term, minor to moderate, beneficial impact during construction. Alternative 2 would contribute to this local, short- term, beneficial impact due to temporary spending on bridge removal construction activity.

Impairment

Socioeconomic resources are not subject to the National Park Service Organic Act and thus, the impairment standard does not apply to this impact topic.

Transportation

Analysis

Under Alternative 2, removal and construction of the South Fork Bridge would have local, short-term, negligible, adverse impacts on transportation and traffic circulation within the park. Given that the temporary Bailey bridge is in place to carry traffic, the demolition/construction of the South Fork Bridge would not preclude visitors, park employees, or concessioners from using Wawona Road. However, demolition/construction activities, including the eventual removal of the temporary Bailey bridge, could cause traffic delays, anticipated to be 30 minutes or less. Construction access to the South Fork Bridge would be provided along Chilnualna Falls Road and Forest Drive. This could cause delays along these routes, while trucks or other equipment accessing Wawona Road, or the placement of equipment in the road, would add a small amount to the minor to moderate congestion experienced on the busiest summer days.

Transit and tour bus services to the park from points south, which travel through Wawona, as well as park tours from Yosemite Valley to Wawona and the Mariposa Grove of Giant Sequoias, could also be affected by traffic delays associated with bridge demolition/construction (including removal of the temporary Bailey bridge). These would also be localized, short- term, negligible, adverse impacts, as the bus tour from Yosemite Valley to Wawona operates only during the summer. Impacts from demolition/construction delays would not be expected to be as widespread when compared to Alternative 1. Bridge demolition/construction activities would occur in a controlled manner and in a delineated area under Alternative 2.

The unpaved parking area in the southwest quadrant of the project site, which serves as informal overflow parking for the paved shuttle bus parking area, would be used for equipment staging during demolition/construction of the South Fork Bridge. Closure of this parking lot to privately owned vehicles would have local, short- term, minor, adverse impacts on the availability of parking near the South Fork Bridge. However, in the long term, the demolition/construction of the South Fork Bridge would reduce congestion by allowing increased speed at which vehicles could cross this bridge, resulting in a local, negligible, beneficial impact to transportation.

Summary of Alternative 2 Impacts

Demolition/construction of the South Fork Bridge (including removal of the temporary Bailey bridge) could create traffic delays that would add to the congestion experienced on the busiest summer days, resulting in local, short- term, minor, adverse impacts to transportation, including transit and tour bus services, under Alternative 2. Closure of the informal shuttle bus parking overflow lot to privately owned vehicles would have local, short- term, minor, adverse impacts to the availability of parking near the South Fork Bridge, as in Alternative 1. However, in the long term, the demolition/ construction of the South Fork Bridge would reduce congestion by allowing increased speeds at which vehicles could cross this bridge, resulting in a negligible, local, beneficial impact to transportation.

Cumulative Impacts

The cumulative impact analysis for transportation in Alternative 2 is the same as described under the No Action Alternative and is based on reasonably foreseeable future actions in the *Yosemite Valley Plan* and implementation of YARTS. Please see the discussion of cumulative impacts under Alternative 1 for a detailed description.

The *Yosemite Valley Plan* has identified management actions to reduce the number of passenger vehicles within the park. The major actions identified include off- park parking areas, an expanded shuttle service, two- way traffic on currently one- way roads, road closures, and a 50% reduction of daily vehicle trips into the east valley. YARTS is a collaborative effort to improve transportation options and reduce reliance on automobile travel. The overall cumulative affect of these management actions, when employed, would result in local and regional, short- and long- term, minor to moderate, beneficial effects on transportation by reducing traffic congestion. Locally, the closure of roads in the east valley may increase private vehicle traffic in the project area. If private vehicle traffic increases, the long- term effects will be minor to moderate and adverse.

The gradual increase in annual visitation to the park would somewhat offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated transportation issues, particularly during the peak of visitation. Alternative 2 would, therefore, contribute to the local, short- term, minor, adverse, cumulative effect on the transportation, traffic, and parking situation near the South Fork Bridge.

Conclusions

Demolition/construction of the South Fork Bridge (including removal of the temporary Bailey bridge) could create traffic delays that would add to the minor to moderate congestion experienced on the busiest summer days. Under Alternative 2, this would result in local, short- term, adverse impacts on transportation, including transit and tour bus services. Closure of the shuttle bus parking overflow lot to privately owned vehicles would have local, short- term, minor, adverse impacts on the availability of parking near the South Fork Bridge, as in Alternative 1. However, in the long term, the demolition/ construction of the South Fork Bridge would reduce

congestion by allowing increased speed at which vehicles could cross this bridge, resulting in a local, negligible, beneficial impact to transportation.

The gradual increase in annual visitation to the park would somewhat offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated transportation issues. Alternative 2 would, therefore, contribute to the local, short-term, minor, adverse, cumulative effect on the transportation, traffic, and parking situation near the South Fork Bridge.

Impairment

Impairment is not addressed in the transportation analysis because this resource topic is peripheral to the protection of the park for future generations.

Visitor Experience

Consistency with VERP this alternative does not include any actions that would be provisions inconsistent with the interim VERP framework.

Recreation

Analysis. The controlled demolition of the South Fork Bridge under Alternative 2 would avoid the potential for serious injuries and/or fatalities to recreational and pedestrian users of the bridge and river associated with a sudden, catastrophic failure of the bridge. Avoidance of hazards to recreational users of the river would be a local, long-term, major, beneficial impact when compared to Alternative 1. However, short-term, local, negligible to minor, adverse impacts could occur to recreational river users should the stretch of river downstream from the South Fork Bridge be closed due to an unplanned, potentially dangerous situation.

Debris deposited in the river channel and sedimentation during bridge demolition/construction, including removal of the temporary Bailey bridge, would be controlled to the extent feasible. This should eliminate the potential for temporary degradation of water quality and the alteration of water flows that could adversely affect active recreational pursuits (e.g., swimming, fishing) in the vicinity of the South Fork Bridge. When compared to Alternative 1, this would result in a local, short-term, minor, beneficial impact on river-dependent active recreational uses.

Alternative 2 would also avoid the impacts on passive recreation activities identified for Alternative 1. Specifically, Alternative 2 would avoid the visually intrusive effects of damage to riverbanks, riparian vegetation loss, and deposition of debris in the river channel that would result from failure of the bridge under Alternative 1. However, short-term, adverse impacts to passive activities such as sightseeing would be expected from the operation of heavy equipment to remove and construct the South Fork Bridge. These impacts are addressed in detail in the Scenic Resources impact analysis section.

Alternative 2 would include plans for incorporating a 5-foot sidewalk into bridge designs. This sidewalk would allow for the safe passage of pedestrians and cyclists, and add an additional location for sightseeing and photography. This would have a long-term, local, negligible, beneficial impact on recreation in the vicinity of the South Fork Bridge.

Under Alternative 2, bridge removal and construction could temporarily interfere with river-related recreation (e.g., fishing, rafting), as well as other recreational opportunities, due to the temporary closure of the river and/or trails (for pedestrians, stock users, or, during winter, cross-country skiers). Construction access to the South Fork Bridge would be provided along Chilnualna Falls Road and Forest Drive. Visitors, park staff, residents, and concessioners seeking

to use these routes may be delayed so workers can safely move trucks and heavy equipment into the demolition/construction area. Under Alternative 2, demolition/construction would be controlled and confined to a delineated area to the extent feasible, having less of an impact on recreation activities than Alternative 1. This would result in a short-term, local, negligible, adverse effect on pedestrian activities in the bridge vicinity, although it would be a beneficial impact when compared to Alternative 1.

Summary of Alternative 2 Impacts. Avoidance of hazards (the potential for serious injury and/or fatality) to recreational users of the river would be a local, long-term, major, beneficial impact when compared to Alternative 1. However, short-term, local, negligible to minor, adverse impacts could occur to recreational river users should the stretch of river downstream from the South Fork Bridge be closed due to an unplanned, potentially dangerous debris situation. These impacts are addressed in detail in the Scenic Resources impact analyses section.

Alternative 2 would include plans for incorporating a 5-foot sidewalk into bridge designs. This would have a long-term, local, negligible, beneficial impact on recreation in the vicinity of the South Fork Bridge. Under Alternative 2, bridge removal and construction could temporarily interfere with river-related recreation (e.g., fishing, rafting), as well as other recreational opportunities, due to the temporary closure of the roads, the river, and/or trails (for pedestrians, livestock users, or, during winter, cross-country skiers).

Cumulative Impacts. The cumulative impact analysis for recreation in Alternative 2 is the same as described under the No Action Alternative. Please see the discussion of cumulative impacts under Alternative 1 for a detailed description. The cumulative effects of Alternative 2, when considered with these past, present, and reasonably foreseeable future actions, are expected to be local, minor to moderate, beneficial impacts in the long term. The short-term, adverse impacts of Alternative 2 on recreation would not offset the long-term beneficial effects of the cumulative plans or projects.

Conclusions. Avoidance of hazards (the potential for serious injury and/or fatality) to recreational users of the river would be a local, long-term, major, beneficial impact when compared to Alternative 1. However, short-term, local, negligible to minor, adverse impacts could occur to recreational river users should the stretch of river downstream from the South Fork Bridge be closed due to an unplanned, potentially dangerous debris situation. These impacts are addressed in detail in the Scenic Resources impact analysis section.

Alternative 2 would include plans for incorporating a 5-foot sidewalk into bridge designs. This would have a long-term, local, negligible, beneficial impact on recreation in the vicinity of the South Fork Bridge. Under Alternative 2, bridge removal and construction could temporarily interfere with river-related recreation (e.g., fishing, rafting), as well as other recreational opportunities, due to the temporary closure of the roads, the river, and/or trails (for pedestrians, livestock users, or, during winter, cross-country skiers). However, under Alternative 2, demolition/construction would be controlled and confined to a delineated area to the extent feasible, having less of an impact on recreation activities than Alternative 1. Therefore, this would result in a short-term, local, negligible, adverse effect on pedestrian activities in the bridge vicinity, although it would be a beneficial impact when compared to Alternative 1. Long-term effects may be minor to moderate and could be beneficial or adverse, depending on the extent to which public transportation eases traffic congestion or closures in the east valley encourage more private vehicles in this area.

The cumulative effects of Alternative 2, when considered with these past, present, and reasonably foreseeable future actions, are expected to be local, minor to moderate, beneficial impacts in the long-term. The short-term, adverse impacts of Alternative 2 would not offset the long-term beneficial effects of the cumulative plans or projects.

Impairment. Alternative 2 would result in local, short- and long- term, minor to major, beneficial impacts on river- related recreation activities from the elimination of hazards associated with catastrophic bridge failure discussed in Alternative 1. Coupled with other beneficial effects (e.g., decreased sedimentation and debris deposition, provisions for a sidewalk on the new bridge) under Alternative 2, the benefits of this alternative offset the short- term, local, negligible, adverse effects that would also be expected. Therefore, Alternative 2 would not impair river- related recreational opportunities.

Scenic Resources

Analysis

Under Alternative 2, removal/replacement of the South Fork Bridge would have local, short-term, adverse, demolition/construction- related effects to scenic resources in the Wawona area. Removal of the existing structure would occur from September to December of 2003. If removal is not completed during that period, in- channel activities could resume in the summer of 2004 during low- flow periods. Removal of the bridge would avoid the adverse scenic resource impacts associated with the structure remaining in place, deteriorating over time, and likely having an uncontrolled failure under Alternative 1. Alternative 2 would avoid the adverse effect of a deteriorating structure, deposition of bridge debris in the river channel, and the associated gouging of the banks and channel, which would damage vegetation. In addition to removal and replacement of the condemned bridge, Alternative 2 would result in the removal of the temporary Bailey bridge that is considered a visual intrusion due to size, construction materials, color, and restoration of the project site, resulting in a local, long- term, minor, beneficial impact on scenic resources of the Wawona area.

Like Alternative 1, Alternative 2 would require the use of heavy equipment to remove and transport bridge materials from the existing site. The presence and operation of the equipment would detract from the scenic resource values of the South Fork Merced River corridor at Wawona. However, because bridge removal activities would be planned and controlled under Alternative 2, it is likely that bridge removal and equipment transport would occur over a shorter period of time and within a more limited area of the river corridor than would be the case under Alternative 1. Accordingly, in avoiding the effects associated with uncontrolled bridge failure under Alternative 1, Alternative 2 would have a local, short- term, minor, beneficial impact.

Efforts would be made to preserve the trees and shrubs of the riparian corridor along the South Fork Merced River, particularly those in and near the construction zone in contrast to the damage likely to occur along the riverbanks under Alternative 1 due to uncontrolled failure of the bridge. Two very large ponderosa pines and one large incense- cedar are present adjacent to Angel Creek in the river- left zone, and these trees would be protected and preserved. As stated in the discussion of mitigation measures in Chapter II, damage to trees would be avoided and any trees so damaged would be repaired or replaced. Some trees will be removed to construct the wider replacement bridge. The impact associated with tree removal under Alternative 2 would be local, short term, negligible to minor, and beneficial, because site revegetation would mitigate individual tree loss by restoring natural landscape patterns at the project site.

The long- term effects of bridge removal would be beneficial under Alternative 2, whereas unsightly portions of the bridge structure could remain under the Alternative 1 scenario of uncontrolled collapse. Therefore, Alternative 2 would result in a local, long- term, negligible to minor, beneficial impact to scenic resources for the Wawona area.

Summary of Alternative 2 Impacts

In avoiding the effects associated with Alternative 1 (e.g., uncontrolled bridge failure, debris deposition in the river channel and riverbank and vegetation damage), Alternative 2 would have a local, short- term, minor, beneficial impact on scenic resources. In addition, removal of the existing condemned bridge, the temporary Bailey bridge, and restoration of the project site would result in a local, long- term, minor, beneficial impact to the scenic resources of the Wawona area, compared to Alternative 1.

Cumulative Impacts

The cumulative impact analysis for scenic resources under Alternative 2 is the same as described under the No Action Alternative. Please see the discussion of cumulative impacts under Alternative 1. Alternative 2 and the cumulative projects within and in the vicinity of the South Fork Merced River corridor would result in local, long- term, negligible to minor, beneficial impacts on scenic resources in the vicinity of Wawona. This is due to the avoidance of visually prominent debris and riverbank damage associated with Alternative 1 and the overall emphasis on natural resource protection and management in the Wawona area.

Conclusions

Alternative 2 would have a local, short- term, minor, beneficial impact on scenic resources because it would avoid the effects associated with Alternative 1 (e.g., uncontrolled bridge failure including debris deposition). The long- term effects of bridge removal and replacement and removal of the temporary bridge would result in a local, long- term, minor, beneficial impact to scenic resources compared to Alternative 1. Alternative 2 and the cumulative projects within and in the vicinity of the South Fork Merced River corridor would result in local, long- term, negligible to minor beneficial impacts on scenic resources. This is due to the avoidance of visually prominent debris and riverbank damage associated with Alternative 1 and the overall emphasis on natural resource protection and management in the Wawona area.

Impairment

Alternative 2 would have an overall beneficial impact on the visual landscape. Therefore, Alternative 2 would not impair scenic resources or values.

Park Operations and Facilities

Analysis

Under Alternative 2, the South Fork Bridge would be removed and a new bridge constructed to accommodate wider travel lanes, shoulders, and a new 5- foot- wide sidewalk. Additionally, the height of the safety railing would be raised to 2- feet 8- inches to meet present safety standards and eliminate the need for park operations staff to discourage pedestrian encroachments and prevent public access to the failing bridge. The potential for emergency bridge debris removal in the event of a catastrophic bridge failure would also be substantially reduced, i.e., it would be much less likely that an immediate and dramatic increase in demand for the full range of park operations and emergency personnel would occur. These changes would constitute a local, short- and long- term, moderate, beneficial effect on park operations. However, operations and emergency personnel would likely be needed to provide project oversight and emergency response under Alternative 2, resulting in less of an effect on park operations when compared to Alternative 1, having a local, short- term, local, negligible to minor, adverse impact.

Removal and reconstruction of the South Fork Bridge would require rerouting utility line conduits for water, sewage, electricity, and communications functions to the temporary Bailey bridge. When the new bridge was completed, the utility line conduits would be transferred to the permanent structure, and the temporary Bailey bridge would be removed. Barring any unforeseen complications in utility line transfer, demolition/construction of the South Fork Bridge, including removal of the Bailey bridge, would have a small impact on the operation of park facilities supported by these utilities. Therefore, short- term, local, negligible to moderate, adverse impacts to park operations and facilities could occur due to utility line transfer.

Summary of Alternative 2 Impacts

Local, short- and long- term, moderate, beneficial effects to park operations would result from eliminating safety hazards associated with pedestrian use of the condemned/closed South Fork Bridge, and substantially reducing the potential for a catastrophic bridge failure. However, local, short- term, negligible to minor, adverse impacts to park operations would be expected from park operations and emergency response staff providing project oversight. Short- term, local, negligible to moderate, adverse impacts to park operations and facilities would also be anticipated in the event of temporary disruption of utility lines carrying water, sewage, electricity, and communications functions.

Cumulative Impacts

The cumulative impact analysis for park operations in Alternative 2 is the same as described under the No Action Alternative. Please see the discussion of cumulative impacts under Alternative 1 for a detailed description. Overall, the past, present, and reasonably foreseeable future actions would have local, minor to moderate, adverse, cumulative impacts, when considered with Alternative 2, because of the increased demand on park operations, services, and facilities in the short term. The moderate, beneficial effects of Alternative 2 would not offset the adverse effects associated with the cumulative plans and projects. In the long- term improvement to park facilities and operations is expected to result in a moderate beneficial impact; however, ever increasing visitor use and aging of these facilities will eventually negate the beneficial impacts.

Conclusions

Alternative 2 would result in local, short- and long- term, moderate, beneficial impacts to park operations by eliminating safety hazards associated with pedestrian use of the condemned/closed South Fork Bridge, and substantially reducing the potential for a catastrophic bridge failure. However, local, short- term, negligible to minor, adverse impacts to park operations would be expected from park operations and emergency response staff providing project oversight. Local, short- term, negligible to moderate, adverse impacts to park operations and facilities would result due to temporary disruption of utility lines carrying water, sewage, electricity, and communications functions.

Overall, the past, present, and reasonably foreseeable future actions in combination with Alternative 2, would have local, minor to moderate, adverse cumulative impacts because of the increased demand on park operations, services, and facilities in the short term. The moderate, beneficial effects of Alternative 2 related to improved facilities would not offset the adverse effects associated with the cumulative projects in the short term. Improvements would have a long- term, moderate, beneficial impact, but this would eventually be negated by increased visitor use and aging.

Impairment

Impairment is not addressed under the park operations and facilities analysis because this resource topic is peripheral to the protection of the river for future generations.